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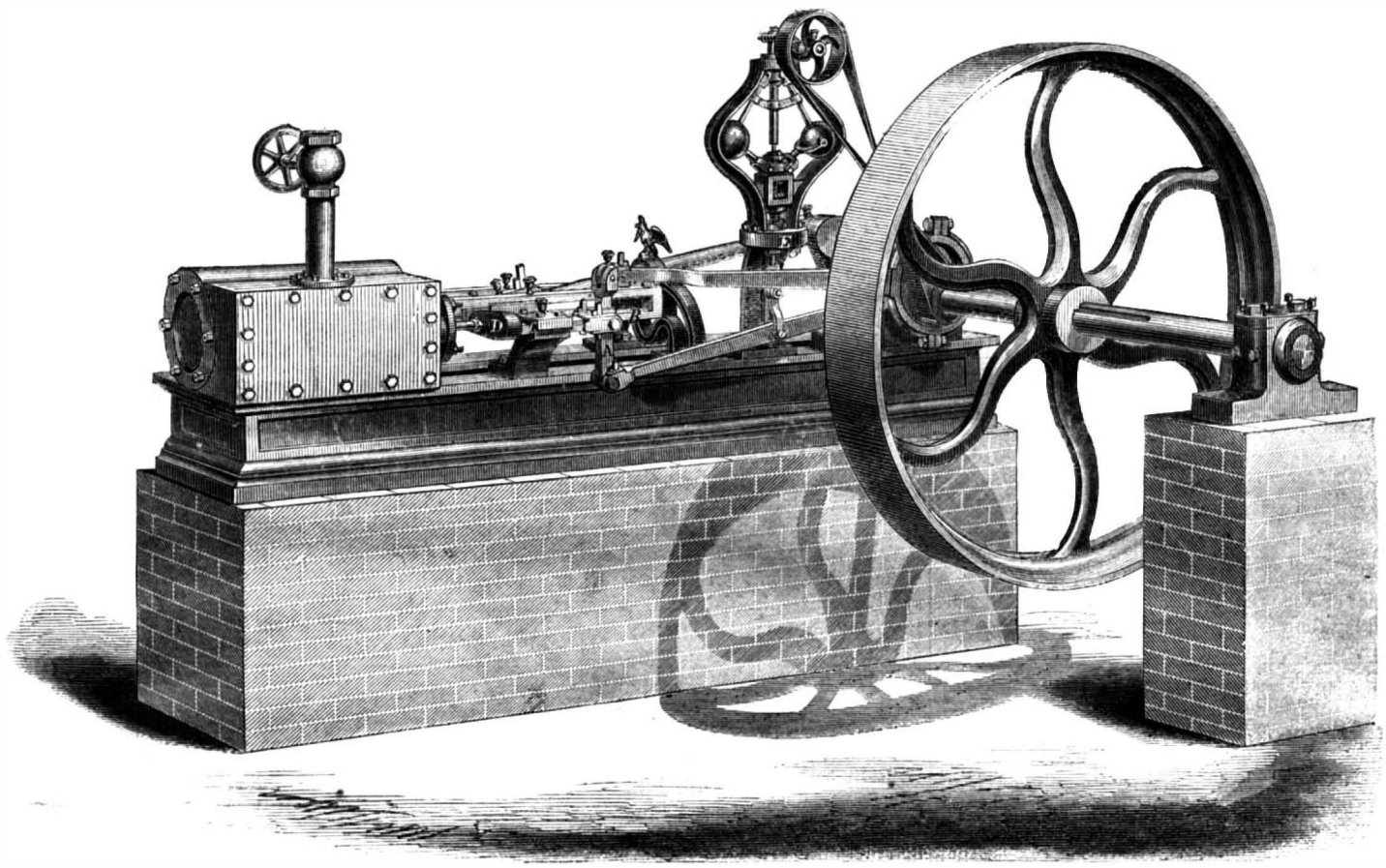
Improved Regulator for Steam Engines.

The engraving gives a perspective view of a steam engine with Douglas's Patent Governor. It is a simple and efficient mode of connecting the governor with the valve, so that not a moment is lost in communicating the action of the balls to the slide valve. The means employed are simple and not liable to become deranged. Its most noticeable feature is a link, A, with sliding box, B. The lower portion of the link is pivoted to an arm, which is secured at the other end by a loose collar around the crank shaft, and has a connection with the governor stem by a pivoted rod. The upper end of the link is curved to form a segment of the circle described by the radius of the lower arm and eccentric rod, and slides freely through the enveloping box, B, which is part of the valve guide, C, connecting with the stem at D.

From this reference to the parts, the operation of the device can be readily understood. Any increase of motion in the governor will raise the screw, E, and with it the arm, the end of which, at A, forms a fulcrum for the play of the link. This will give a shorter reciprocating motion to the valve, and cut off the supply of steam. In the same way the depression of the arm at A will allow the eccentric to exert almost its full throw on the valve stem, and thus increase the amount of steam admitted.

The value of this simple attachment will be acknowledged by engineers and mechanics. It was patented Sept. 8, 1863, by Frank Douglas, of Norwich, Conn. For further information, address the manufacturers, C. B. Rogers & Co., as above.



DOUGLAS'S REGULATOR FOR STEAM ENGINES.

EXPERIMENTS are still in progress which may possibly lead to the substitution of cast-steel barrels for those now employed in the Enfield rifle.

Depths of the Sea.

A French journal says that the soundings for the new transatlantic cable have enabled comparisons to be made of the depths of the different seas. Generally speaking, they are not of any great depth in the neighborhood of continents; thus, the Baltic, between Germany and Sweden, is only 120 feet deep; and the Adriatic, between Venice and Trieste, 130 feet. The greatest depth of the channel between France and England does not exceed 300 feet, while to the southwest of Ireland, where the sea is open, the depth is more than 2,000 feet. The seas to the south of Europe are much deeper than those in the interior. In the narrowest part of the Straits of Gibraltar the depth is only 1,000 feet, while a little more to the east it is 3,000 feet. On the coast of Spain the depth is nearly 6,000 feet. At 250 miles south of Nantucket (south of Cape Cod) no bottom was found at 7,000 feet. The greatest depths of all are to be met with in the Southern Ocean. To the west of the Cape of Good Hope 16,000 feet have been measured, and to the west of St. Helena 27,000. Dr. Young estimates the average depth of the Atlantic at 25,000 feet, and of the Pacific at 20,000 feet.

Gun Trial in England.

We learn from the London *Engineer* that the prize offered at Wimbledon for the best breech-loader, has been won by an Enfield rifle converted, on a plan invented by Col. Berdan, of this country.

The Berdan musket was fired from the shoulder, before the members of the Board, one hundred times in five and a-half minutes—the first twenty rounds in one minute. It had previously been fired three hundred times for the purpose of "fouling" it; had then been rusted in salt and water, and afterward rolled in fine sand; and, finally, was subjected to proof charges with the sediment of four hundred charges in it, but came out in perfect condition, and was again fired with safety. This extraordinary result is probably without a parallel in the history of small arms.

The rapidity of fire of this arm is more than double that of the famous "needle gun" of the Prussians.

Kaolin Works.

About six miles from Augusta, Ga., on the South Carolina side, are situated the kaolin potteries. Before the war but little work was done there, but the present owners, Messrs. Mosher, Thomas & Schaub, have rebuilt and refitted the works, which had fallen into decay. A bed of kaolin has been recently discovered from 15 to 30 feet deep, which compares favorably with the clay used in English potteries. The process of making kaolin into articles for household use is as follows. The kaolin is put in its crude state into mixing tubs and ground up with proportionate quantities of felspar, quartz, or flint, bald and china clay, and, after going through two or three processes, is molded into any desired shape, and subjected to an intense heat in a biscuit kiln for 48 hours, after which it is put into a glazing kiln for 36 hours, and is then ready for use.

Upward of seventy workmen are employed, most of them having had long experience in the English works. Mr. Lawton, the superintendent, was for many years in the Staffordshire potteries.

A MISSOURI paper announces the discovery of a new oil in Pike county. It is obtained from bituminous shales, and from tests made, it appeared to be richer than petroleum and non-explosive; one hundred pounds of shale yielded three gallons of oil.

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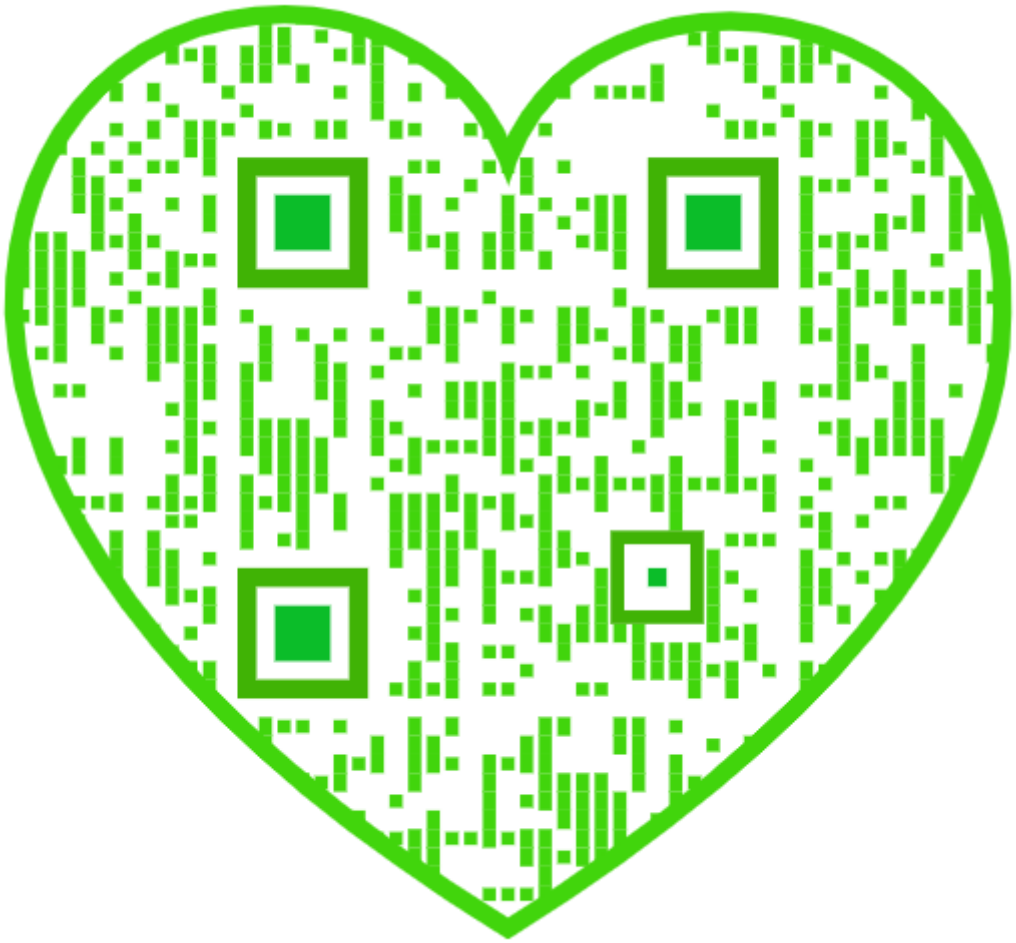

A WEEK ON OIL CREEK.

BY PROF. CHAS. A. SEELY.

I have spent a week on Oil Creek. From my point of departure—the "Crittendon House," a very excellent hotel at Titusville—I have made daily excursions up the neighboring "runs," and over the "farms" which are famous in the history of oil.

[A "run" is a little brook which flows down a wild ravine; and a "farm" is a strip of mud, limited on one edge by the Creek, while the other loses itself among the rocks and trees of a precipitous and ragged hill side.]

This is the region of wonders. I have picked up enough material out of which to make several books, or on which to found stories that would require a life time to relate. There is something here for every pleasure-seeker and every lover of the marvelous. The *blasé* gentleman who looks down the crater of Vesuvius and finds nothing in it, may still hope here to experience a new sensation. If he is not moved by what may on any day be observed, let him wait a little while for a flood or a conflagration!

But the SCIENTIFIC AMERICAN calls for practical facts, and out of my budget I select a few which, by reason of their novelty and utility, I consider most presentable. The inventor has recently been on Oil Creek, and his devices have changed the whole order of thought and action so quickly and thoroughly that one is reminded of the shifting of scenes at a theater. These devices are what I mean above by practical facts; I proceed to exhibit some of them.

HARLEY'S PIPES.—A few months ago processions of wagons, carrying oil in barrels, were constantly floundering up and down the mud farms on Oil Creek; the profane shouts of the teamsters filled the air. But to-day all is changed; no more barrels, no wagons! I trust the poor horses and the teamsters are engaged in better business. The music of the engine, the pump, and the drill was all the sound I heard. It is to Harley's pipes that much of this happy change is due. Mr. Harley has laid iron pipes over the hills, down the "runs," across the "farms," and stops only when he reaches the railroad station. Through these pipes the oil flows almost literally out of the wells aboard of the railroad car. The propelling agent is, of course, the steam pump. Thus oil, 600 feet below the surface of the earth, at Oil Creek, reaches Jersey City, a distance of over 400 miles, without having been touched by the hand of man. Many miles of pipes are now in successful use, and Mr. Harley proposes to lay a line of pipe from Petroleum Center to the Alleghany River, a distance of about ten miles. I wish the politicians would lay their pipe to as good purpose as does Mr. Harley.

CAR TANKS.—When it was the fashion for wells to flow at the rate of thousands of barrels per day, it was found impossible to procure with sufficient promptness vessels to contain the oil. There was an immense demand for barrels, and all the coopers were busy; there was danger that the barrel stock of the country would soon be exhausted. When barrels became plentiful the fact was developed that many evils attended their use, and that they must be abolished. Harley's pipes and storage tanks —some of them are of the capacity of thousands of barrels—relieved the farms and the runs, and at last the car tanks took the place of barrels on the railroads. To-day crude oil is not carried by rail in barrels. The car tanks are a permanent fixture on the car. Two tanks, each of the capacity of forty barrels, built of clear pine planks, and provided with closely-fitting covers, are attached firmly, side by side, to the floor of the truck. I suppose there are now in constant use thousands of these oil cars. Some of them may be seen any day in Jersey City, and on a journey by the Erie Railway they will be found everywhere along the road.

COL. ROBERTS'S TORPEDOES.—The natural reservoirs of oil are supposed to be fissures and other cavities in the rock. If the boring tools do not penetrate one of these cavities no oil is "struck;" a miss was supposed to be as good as a mile. The reamer which enlarges the diameter of the work of the drill only an inch, has, in several cases, struck oil and made a valuable well out of what otherwise would have been a "dry hole." How tantalizing it must be to the man who gets no oil after spending $10,000 in boring, to reflect that he may have attained to within half an inch of a fortune! But now Col. Roberts, with his torpedo, infuses new hope among the proprietors of dry holes, and he promises more rapid fortunes to those who own the paying wells. I find an excellent description of the torpedo and its uses on page 54, current volume of the SCIENTIFIC AMERICAN, and I have only to add that I am a witness to the great utility of the invention. While on Oil Creek I visited personally twenty-one wells in which thirty torpedoes had been exploded, where, in every case, the well had been improved, and the aggregate increase was upward of 1,200 barrels of oil per day. The increase of production on Oil Creek, by reason of the torpedo, probably exceeds 3,000 barrels per day. There used to be talk about sinking shafts eight or ten feet in diameter down to the oil strata, and then running drifts after the oil reservoirs. The torpedo seems to be the practical realization of that fanciful dream.

For the Scientific American.

History of the Ram "Dunderberg's" Machinery.

In July, 1862, Mr. Wm. H. Webb obtained a contract from the United States Government to build an ironclad steam ram with a casemate and two turrets on the casemate deck, of his own design, and of about the following dimensions:—Length, 360 feet; beam, 72 feet; draft, 20 feet; with one screw about 20 feet diameter; the engines to be similar to those of the Russian and Italian frigates built by him; the cylinders to be 90 inches diameter by 45 inches stroke, and the speed to be 15 knots an hour at sea. The plan was afterward changed by dispensing with the turrets, extending the casemate, and increasing the steam cylinders from 90 to 100 inches in diameter.

Mr. E. W. Smith was employed by Mr. Webb to draw up specifications, furnish plans for, and superintend the construction of the enlarged engines, and the contract for building this machinery was given to Mr. John Roach, of the Etna Iron Works, New York City. Mr. Smith, on his being intrusted with this work, applied, in August, 1862, to Mr. Thomas Main (then Chief Engineer at the Allaire Works, New York City), to assist him in preparing the plans and specifications for this machinery. Mr. Main devoted his evenings to this work at his residence during August, September, October, and November, 1862, and placed his collection of books, drawings, and sketches, relating to marine engines, at Mr. Smith's service. Mr. S. devoted his evenings occasionally to consult on this matter and write the specifications—Mr. Main being always present, making references, calculations, and consulting on the subject. Owing to the engines being enlarged, sufficient grate surface could not be got in the space, with boilers similar to those in the Italian frigates, and Mr. Smith proposed double furnaces (similar to the Collins boilers and the *Puritan's* and *Dictator's*), with horizontal tubes. This plan he afterward matured. It was considered that engines of the Italian frigate type (with condenser, pillow block, and air pump all cast together), would be unsafe on so large a scale, and Mr. Main proposed engines similar in construction to those of the U. S. S. *Iroquois*, designed by him for the Fulton Iron Works, in 1858. This plan of engines was adopted with certain modifications made by Mr. Smith and General Inspector W. W. W. Wood. Mr. Smith proposed to substitute the Worthington duplex pump, to work independently from the main engines, in place of the air and circulating pumps, and to hang the cross-head slides from the under side of the condenser. He adopted Holmes's method of applying the cut-off valve on the back of a double-ported valve; also Waddell's method of packing the valve to relieve the pressure on the back; also Allen's method of packing the condenser tubes, Wilmarth's universal shaft coupling, and Silver's governor. Mr. Wood proposed to make four pillow-block frames in place of three, to make the pillow block in halves, so as to take out the bottom brass without moving the shaft, and to have double ports in the valves, similar to the *New Ironsides*. These points were settled about the close of the year 1862.

In December, of that year, Mr. Main was employed by Mr. Roach, of the Etna Iron Works, as superintending and constructing engineer, for the machinery of the *Dunderberg*, for two gunboats, and for one steamboat, which he had contracted to build, and nearly all the shops and tools had to be constructed in order to execute this work. From this time the whole responsibility of designing, arranging, and carrying out the details of the *Dunderberg's* engines actually devolved on Mr. Main. The working drawings were all made at the Etna Iron Works, many of them by him, and all of them from his sketches, and by his direction. They embrace the propeller stern work, line shafting, thrust pillow block, valve gear, steam and cut-off valves, reversing engines and gear, bilge and feed pumps, sea valves, holding-down bolts, smoke pipes, hoisting gear for the smoke pipes, arrangement of steam pipes, feed and blow pipes, stop valves, fire-room floor, platform and blower arrangement, stairs, galleries and railing, lugging water and oil pipes to main journals. Mr. M. introduced a new way of putting the crank shaft together by boring the crank eyes in their places, heating them and shrinking them on the pins, and so making a perfect job. He also introduced a method of circulating water through the crank-pin boxes by means of jointed pipes. He also proposed to make the steam valves and chests in two sections (so as to go in the planing machine then at the Etna Works), to place the valves at an angle, extend the steam chests in length, carry the ports direct out from the cylinder, and thus reduce the clearance to the minimum space, while one set of gear will work the valves. He further introduced deflecting plates around the dry pipes, inside of the boilers, for the purpose of precipitating the water forced up with the steam, and so preventing it from entering the steam pipes; also a water trap on the main steam pipe to collect the water into a receiver, from which it is blown into the condenser, and from thence it goes back to the boliers These devices have been resorted to, in order to obviate the difficulty of working water in the cylinders, which was found to occur in the preliminary trials at the dock.

The independent pumping engine—or Worthington duplex pumps—were designed and constructed at the Hydraulic Works, South Brooklyn. Mr. Smith superintended this machinery in a general way, examining and approving the plans occasionally during its construction. Mr. Roach is deserving of a great deal of credit, inasmuch as, from a comparatively small beginning, he has frunished the means to build up a large concern, capable of executing the largest work in the country, and for his excellent arrangements for making large castings, and for the solidity of the foundations for the large tools, so that they may do the largest and best class of work.

This statement has been drawn up with the view of giving an unbiased and fair account of the progress of the machinery of the *Dunderberg*, as there have been many inquiries about the design, and many imperfect accounts in regard to it published in the daily and weekly papers. IMPARTIAL.

Petroleum Formed from Seaweed.

This theory of the formation of rock oil has been advanced by Prof. Wilbur, of Hamilton, C. W. His idea is that petroleum has had its source in marine vegetation, just as coal has been derived from terrestrial plants. Few persons have an adequate idea of the immense growth of seaweed in the depths of the ocean. After their term of growth was completed they became detached, floated off, and finally sunk to the bottom. It is a received opinion among geologists that this portion of the North American continent had once been the bed of a salt water ocean. The ocean floor, as must be remembered, was not level, but had throughout its whole extent deep hollows and ridges. It was, of course, in these deep hollows that these seaweed deposits would find their last resting place after long tossing about in the waves and ocean currents. In this way it would come to pass that they would not be evenly distributed over the bottom, but only in those hollows or pockets. Meanwhile, the deposit of solid stratified rock, or what afterward became such, was going on, and after untold ages these masses of seaweed became covered to various depths. He considered it no very unreasonable or unscientific supposition that these masses of oily, carbonaceous matter should, under the circumstances, take the form of oil, of a liquid hydro-carbon.

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THE PEN---ITS CONSTRUCTION AND USE.

We have no desire to write an essay on the doubtful axiom that "the pen is mightier than the sword;" but we design merely to draw attention to some facts and reflections on the use and the construction of this wonderfully powerful instrument.

The split pen, now universally used by enlightened nations, is of great antiquity. It was used by the Egyptians in writing on the sheets produced from the papyrus, from the name of which our word paper is derived. It was made from a species of reed, which was prepared by a sweating process, induced by burial under fermenting manures, causing the reed to acquire hardness and elasticity, and drying the pith. These pens are still in use in the East.

Later, the quills of the swan, eagle, goose, and crow came into use as pens, and those of the goose, especially, are still largely used, notwithstanding the introduction of pens of steel, gold, and other metals. Goose quills, when first plucked, are soft and tough, covered within and without with a membrane. They are dried in hot sand, which shrivels the outer skin and the inner pith. They are then dipped in a hot solution of alum, or in diluted nitric acid, which hardens them.

The immense consumption of quills proved the necessity of a more durable pen, and in 1822 Mr. Gillott, of Birmingham, succeeded in producing excellent pens of sheet steel. Being the first to succeed in this manufacture, he still stands at the head, both for quantity made and quality of work. Gillott's pens have a world-wide reputation, and are deservedly esteemed. We believe there are but few manufactories in this country, that of the Washington Medallion Pen Company, and that of the Estabrook, in Philadelphia, being among the largest. The processes of manufacture are very simple. The blanks are punched from a thin sheet, then the hole which marks the termination of the slit is punched; the device or lettering is then made by a stamp. Dies give the semi-cylindrical curve to the blanks. Grinding perfects the nibs, and gives the requisite elasticity. The slitting is done by two cutters, one working against the other. Hardening and tempering, with the careful assortment of the products of the manufacture, complete the work.

But there is a certain unyielding rigidity in steel pens which prevents them from being universally preferred to the goose quill. They manifest also a tendency to adhere to the surface of the paper, requiring some degree of force to propel them, and sometimes piercing the sheet. For these reasons many are disinclined to use them. The gold pen, when properly made, approaches more nearly to the qualities which have for so long a time made the goose quill the favorite as a medium of writing. But even the best of the gold pens are by many deemed inferior to the quill, and this prejudice, or partiality, induced the manufacture of pens from quills by machinery, which were used in the same way the steel or gold pen is used, by being fastened in a holder. Some years ago the manufacture of these quill pens was extensively prosecuted in Taunton and Boston, Mass. They never, however, won their way to public favor.

Gold pens were first successfully made in this country by Mr. Levi Brown, of Detroit, in 1840. We believe he continues still to manufacture in New York. Without disparagement to others, it may be safely asserted that the pens made by him have never been surpassed. We purchased one in 1847, bearing that date and his name, which we used continually for over fourteen years, and then presented it to an editorial friend, who still employs it in his daily labors. Gold pens are tipped with iridium, making what are commonly known as "diamond points." The iridium for this purpose is found in small grains in platinum, slightly alloyed with this latter metal. In this form it is exceedingly hard, and well adapted to the purpose of the gold-pen maker.

The gold for pens is alloyed with silver to about sixteen carats fineness, rolled into thin strips, from which the blanks are struck. The under side of the point is notched by a small circular saw, to receive the iridium point, which is selected with the aid of a microscope. A flux of borax and a blowpipe secure it to its place. The point is then ground on a copper wheel with emery. The pen blank is next rolled to the requisite thinness by means of rollers especially adapted to the purpose, and tempered by blows from a hammer. It is then trimmed around the edges, stamped, and formed in a powerful press. The slit is next cut through the solid iridium point by means of a thin copper wheel, fed with fine emery, and a saw extends the aperture along the pen itself. The inside edges of the slit are smoothed and polished by the same means of rapidly-running wheels and emery, and burnishing and hammering, to produce the proper degree of elasticity, finish the work.

THE MANUFACTURE OF LEAD PENCILS.

The lead pencil is in more general and constant use than almost any other implement considered necessary among civilized people. It is difficult to assign a date to the first use of graphite, or plumbago, for writing purposes, but the device of incasing the mineral in a cylinder of wood is quite modern. The celebrated mine at Borrowdale, Cumberland, in England, furnished the first specimens of graphite from which writing and drawing implements were made. The mineral was originally obtained from this mine in nodules, or distinct masses of varying sizes, and the pencils were cut from them without any intermediate process of manufacture. The mine was considered so valuable that it was protected by guards, and the workmen wrought under the most rigid surveillance. The mine was worked only once in seven years, subsequently for six weeks in each year, in order to husband the supply and control the market; yet this six weeks' product was frequently valued at from £30,000 to £40,000.

Mines of graphite exist, and have been or now are worked at Sturbridge, Mass., Brandon, Vt., Fishkill and Ticonderoga, N. Y., Wake, N. C., and St. John, N. B. It is largely used in the manufacture of crucibles for melting refractory metals, and under the name of black lead, or carburet of iron, for polishing iron castings, as stoves. Molds for iron are often faced with the powdered plumbago, to give a finish to the surface of the casting, and it is employed with oil as a lubricator for heavy journals.

But graphite is more familiarly known in its employment as pencils. It is ground to fine powder and treated with acids to purify it from foreign substances. Then, being mixed with water, it is molded into cylindrical masses and dried in a kiln. Being afterward baked in crucibles until the requisite degree of hardness is attained, which is determined by the grade intended for the pencil, the cylinders are ready to be cut into the proper form for insertion in the wood. This is the French style, varied, however, by additions of clay in certain proportions with the powdered graphite, as it is intended to give differing consistencies to the pencils. The American Lead Pencil Company, whose works are in Hudson city, New Jersey, employ a different process. The molded graphite is seasoned several months in vaults, and then baked, the hardness of the pencil depending on the length of exposure to heat, when the cylinders are forced through dies in a press and cut into square lengths for the wood.

The wood is dyed, sawed into strips of sufficient width for four pencils, grooved, the strips of plumbago inserted and covered by corresponding strips of wood secured with glue. These strips are then cut into pencil lengths, and, by machinery, planed or turned to an octagonal or cylindrical form, polished, and stamped with the name and quality of the pencil. The graphite used by this company is procured mainly from New York State, and the pencils are of excellent quality, as we have ascertained by trial.

THE amount of tobacco raised in 1850 was 199,736,336 pounds, and, in 1860, 429,364,751 pounds, an increase of 115 per cent. It is a matter of common belief that it is mainly a Southern crop. Of the crop of 1860, the loyal States produced 230,343,321 pounds and the disloyal States but 199,021,430 pounds. This gives the loyal States more than half of the entire crop. The increased production since 1860 has been the greatest in the loyal States. Therefore, tobacco is a crop in which all the States are interested, and one which seems well adapted to almost every climate of the United States.

MANUFACTURE OF WHITE LEAD.

Mr. Spence has recently patented in France a method of making white lead, which consists in dissolving the oxide or the carbonate of lead by the employment of an alkalied caustic solution, such as caustic soda. The oxide or carbonate of lead, or substances which contain them, are reduced to powder and mixed with the solution of caustic soda. It is not necessary that this solution should be hot. After it has been dissolved, a fresh supply is added until all the carbonate of lead in the powdered sub stance is dissolved. The patentee affirms that all minerals which can, by being calcined, or by other methods, be converted into an oxide or carbonate of lead, or which contain a considerable portion of this carbonate, can be used for the manufacture. They are calcined at a low temperature, in an ordinary reverberatory furnace, or in any other convenient furnace. These substances are then heated till the lead glance is completely calcined, but avoiding its reduction to lead metal. The galena is converted partly into oxide of lead and partly into sulphate of lead. Before mixing these products with the caustic solution, they should be submitted to the action of a solution of soda ash; but if the calcined galena, or the mineral containing it, also contains oxide of copper, or a large quantity of oxide of zinc, these latter can be dissolved by a solution of caustic soda.

The ammoniacal solutions of carbonate of ammonia, or of carbonate of soda, do not dissolve the oxide of lead; they simply eliminate the sulphuric acid or the sulphate of lead. If the minerals or other substances only contain a small quantity of oxide of zinc, and if their solution by the caustic soda and their precipitation with the carbonate of lead are not considered prejudicial, it is then pre ferable to employ a solution of carbonate of soda to eliminate the sulphuric acid.

The soda or ammoniacal solution being withdrawn and washed with water, the substance containing the calcined galena is then filtered in order to be mixed with a solution of caustic soda. Having thus obtained, from all these minerals or substances containing the oxide or carbonate of lead, by the mix ture just spoken of, a liquid containing oxide of lead in solution, it is allowed to stand until perfectly clear, and then placed in several vases into which can be easily injected a continuous current of carbonic acid gas by means of pipes pierced by many small holes.

The carbonic acid gas combines with the soda and the oxide of lead, and as soon as the soda is carbonized the gas unites with the oxide of lead, and is precipitated as a pure white substance, composed partly of oxide and partly of carbonate of lead. As soon as it is seen that the precipitation of the oxide is no longer continued, the injection of gas is stopped, and it is then that the white lead is deposited. The solution becomes carbonate of soda, is separated, and after having been submitted to the action of caustic of lime it is again ready to act upon the substances containing—as has been shown above—oxide or carbonate of lead.

For the precipitation of this oxide of lead, the carbonic acid gas that the patentee employs, can be obtained either by the action of hydrochloric acid on lime or on carbonate of lime, as well as by the combustion of coke or wood charcoal, or in any other convenient manner. It is, however, necessary that there should be no sulphureted hydrogen in the carbonic acid employed.

Carbonate of ammonia or bi-carbonate of soda, or any of the soluble carbonates, can be used for the precipitation of white lead; nevertheless, Mr. Spence prefers carbonic acid gas as being the most economical. The solution of soda employed with the calcined galena should be replaced after a certain time, when it is converted into sulphate of soda. The ammoniacal solutions can be separated from the copper and zinc by the recognized methods. The solution of soda can be employed afresh. It is only necessary to be made caustic by quicklime, after the precipitation, and before it is used again, to dissolve the oxide of lead.

The white lead which is precipitated should be washed in pure water, and afterward dried before being used.

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"WELL-ROTTED MANURE."

The phrase "well-rotted manure" has been a costly one to the farmers of the country.

About half the substance of trees and other vegetables is carbon, and this is obtained principally from the atmosphere through the leaves in the form of carbonic acid. The underside of every leaf is filled with innumerable mouths (called *stomata* by botanists) through which carbonic acid is absorbed from the air. Each molecule of carbonic acid is made up of one atom of carbon and two atoms of oxygen, the proportion by weight being 6 pounds of carbon to 16 of oxygen. In the leaf the molecule is broken up into its constituent elements—the oxygen is returned to the atmosphere, and the carbon is carried by the sap and deposited to help build up the structure of the plant. Exact experiments have shown that this decomposition does not go on in the night, and there is no doubt that it is effected by the actinic or chemical rays of the sunbeam.

The burning of charcoal is simply the recombining of its carbon with the oxygen of the air, forming again carbonic acid—an invisible gas which floats away in the atmosphere. All chemical actions are accompanied by a change of the temperature, and in this case the change is so great as to produce the heat and light of combustion. Frequently carbon and oxygen combine more slowly than in the act of burning, and then, though the quantity of heat produced is exactly the same as in the case of combustion, it is not so intense—the intensity being in proportion to the rapidity of combustion. One instance of the slow combination of carbon and oxygen is fermentation. In some forms of fermentation the oxygen is absorbed from the atmosphere, and in others it is obtained from combination with other organic elements.

When manure is piled up in large heaps and allowed to ferment, one of the principal products of the fermentation is carbonic acid. If the manure is about the roots of growing rye, wheat, or other crop, as the carbonic acid rises among the leaves a large portion of it is caught by their *stomata*, and the carbon is appropriated to build up the plant. On the other hand, if the fermentation takes place where there are no leaves, the carbonic acid is blown away by the wind, and is wasted. It is not uncommon for farmers in their desire for "well-rotted manure," to burn up one-half of their most valuable fertilizer. If a man wants to utilize the whole of his manure, the place to have it rot is beneath the thick clustering leaves of his growing crops.

SALT--ITS USES AND PRODUCTION.

It would be interesting if one could learn the secret of the strange yearning mankind has for salt. It occurs in every part of the human frame; it creeps into every corner of the body, and plays a part in all the complicated processes of life, without which the machinery would be arrested in its operation.

Salt possesses a peculiar interest from its being one of the usual and necessary constituents of food, while the enormous consumption in the arts invests this substance with an importance second to none. As early as the time of the destruction of Sodom and Gomorrah, mention is made of it in connection with the judgment against Lot's wife, and in Leviticus it is alluded to as a preservative and a component of the prescribed sacrifice. In the Gospels it is employed as an emblem of eternity, wisdom, and purity, which no doubt has established the tradition still existing among some heathen people, that salt is an emblem of hospitality. In the Eastern story of the "Forty Thieves," the chief robber enters the house of Morganza's master on a false pretense, and is enjoined to make such excuses whenever his host offers him salt as will enable him to refuse partaking of it without suspicion.

Although salt is employed very extensively in the arts, we more commonly recognize it as a preventive of putrefaction of almost all our aliments, without producing any such change upon them as to render them unfit for nourishment. As an antiseptic it is proved by experiments that though common salt, when mixed with animal substances in large proportion, preserves them, yet when a small quantity of it is employed, it considerably accelerates putrefaction. Hence it appears that small quantities of salt, such as are taken with food, facilitate digestion, which is a kind of putrefaction, and serves at the same time as a mild stimulant to the stomach itself.

It would be curious to trace the history of the common law as applied to the production and sale of salt, but this subject is foreign to our present purpose. At the present time the salt trade in Europe is guarded by very strict laws, differing in each according to the facility of production.

The most important salt mines in the world are those of Cracow, in Poland, and Salzburg, in Austria, which supply large quantities of rock salt. In the United States large quantities of salt are used for pickling and curing meats for foreign markets, and of the 30,000,000 bushels annually consumed, about one-half is imported; but as the home supply is rapidly increasing, it will ere long equal the demand.

The saline springs of Onondago county, in this State, yielded last year 2,928,187 bushels, which shows an increase of 714,000 bushels over the previous year. In 1860 the Saginaw salines, of Michigan, yielded only 20,000 bushels, while in 1865 the product reached 3,200,000 bushels. The Hocking Valley and Pomeroy mines, in Ohio, yield very largely, as also do those in Pennsylvania, Texas, Illinois, Louisiana, Missouri, and West Virginia. The Kanawha, W. Va., salt works produced before the war annually 300,000 bushels, and the Pennsylvania springs yielded about 1,000,000 bushels. There are two methods of procuring salt from the springs—by boiling and by solar evaporation—but with the exception of Ohio and Pennsylvania, where fuel is at hand and cheap, solar evaporation is generally resorted to.

The brine is brought to the surface by force pumps from wells from 100 to 300 feet deep, the deepest water yielding most salt—the proportion being about 56 pounds of salt from 30 to 45 gallons of the best brine. It is then exposed in vats to the sun or placed in kettles and boiled, and the residuum—salt—is dried for sale.

From the rapid annual increase, it is fair to presume that in a short time, comparatively, the supply of salt will be more than sufficient for home consumption, and American provisions shipped to the Old World will be wholly cured with American salt.

Dyeing Fabric and Yarn.

A patent has recently been taken out in England for dyeing, by John Lightfoot, the object of which is to dye, print, or stain a fast black from aniline on wool, silk, feathers, or other animal substances or fabrics made from wool, and also fabrics made of a mixture of animal and vegetable substances, such as delaines, and similar mixed goods.

For mixed goods I wince or steep them in a solution of hypochlorite of lime, commonly known as chemick, or a mixture of hypochlorite of lime, hydrochloric acid, and water, for the purpose of preventing the deoxidizing properties of the animal fibers and substances, thereby rendering them capable of receiving the aniline black.

Although I have here named only hypochlorite of lime, I wish it to be understood that other similar oxidizing agents will answer the purpose, such as hypochlorous and chlorous acids, hypochloric, chloric, and perchloric acids, or a solution of their salts of alkaline or metallic bases. Other oxidizing acid salts, such as nitric acid, nitromuriatic acid, bichromate of alkalies, and permanganate of alkalies, will produce a certain effect; but I prefer as more economical and of greater utility, the chlorine mixtures before described. When the wool or animal substance is thoroughly oxidized to its maximum, and in a fit state to receive the aniline black already named (by oxidation being understood the change, whatever it may be, that animal fibers undergo, when exposed to the substances described), it may be known by the following simple test:—Take a dilute solution of permanganate of potash in two test tubes, and into one put a piece of the oxidized wool and into the other a piece that has not been oxidized, and apply a gentle heat: the solution containing the one that is in a fit state to receive the aniline black remains pinky, but the other is decolorized immediately.

The proportions for preparing the wool are about as follows:—I take for every pound of cloth, wool, yarn, silk, delaine, feathers, or animal substance (well cleaned) six gallons of water at about 100 deg. Fah., two and a-half ounces by weight of hydrochloric acid of commerce, and one pint of hypochlorite of lime in solution, containing sixteen ounces of hypochlorite of lime per gallon. I keep the goods in this solution for from twenty to thirty minutes, or until the wool becomes quite yellow; I then wash well in water and dry.

I am aware that woolen fabrics and fabrics of mixed wool and cotton have been previously steeped or prepared in mixtures containing chlorine or hypochlorous acid for the purpose of subsequently printing or dyeing such fabrics with ordinary colors not aniline black, but the chlorodizing or oxidation sufficient for such purposes is not applicable to aniline black, and a point of oxidation or chlorodizing is required which would not be advisable to give to fabrics intended for ordinary colors.

In dyeing coburgs and similar goods the present processes involve two operations; first, the cotton has to be dyed, and then the wool or silk. I avoid this twice dyeing by preparing the mixture of cotton, wool, silk, or other animal substance as above, so that they will both take a black dye at one and the same time. I steep or pad the goods either before dyeing or after in the following dye:—One gallon o water, four ounces of chlorate of potash, twelve ounces of chloride of aniline crystals, six ounces of sal-ammoniac, two ounces of sulphate of copper. I then dry the goods at as low a heat as possible and age for two or three nights in a moist room at from about 76 deg. to 80 deg. Fah., and when the color is thoroughly developed it becomes an intense myrtle green, almost black. I raise the goods either in water or any weak alkali, or in a weak cold solution of neutral chromate of potash, which I use in preference; and if a brownish black is required, the goods may be subsequently dyed in a weak hot solution of archil or cudbear.

When the prepared cloth is used for printing, I print on the aniline black color, and dry and age in a warm moist room, and raise in a weak alkali as before. I then pass the goods through a warm solution of sulphite or hyposulphite of soda, or a solution of any suitable deoxidizing agent, to improve the white or whites; or the goods may be passed through one of Mr. Thom's sulphuring apparatuses, which restores the white in the parts not printed, but does not injure the black. It is preferable, after sulphuring, to repass the goods through a weak alkali.

Report on Disinfectants.

In the first number of the present volume we referred to, and made some extracts from, the report "On the Application of Disinfectants in Arresting the Spread of the Cattle Plague," by William Crookes, F.R.S., a distinguished chemist, of London. We are now indebted to Mr. Crookes for a pamphlet copy of his very able and exhaustive report on the general value of disinfectants. In reference to the cause of the propagation of the cattle disease, he says:—

There are weighty reasons for deciding that the infecting matter is neither a gas nor even a volatile liquid. The almost infinite attenuation which a gas undergoes, owing to its rapid diffusion into the atmosphere, would render its supposed noxious influence imperceptible a few yards from the focus of infection. Moreover, the infection is capable of being carried considerable distances in clothing or running water, and in a variety of ways incompatible with the behavior of gases. For these reasons, and many others unnecessary to adduce here, it seems clear that the disease must be communicated by the agency of solid, non-volatile particles.

In regard to the various substances employed as disinfecting agents, he gives the preference to tar acids (carbolic and cresylic) as, under all circumstances, the most powerful in arresting all kinds of fermentative and putrefactive changes.

The Board of Health has just resolved to adopt the use of carbolic acid as a disinfectant, and have made a contract with a chemist in this city to furnish a liberal supply. This subject is one that urgently commends itself to the Health Boards of Cincinnati, St. Louis, New Orleans and other cities, where the cholera is now existing.

THE curvature of the earth amounts to seven inches per mile. A man six feet high cannot be seen from a distance of ten miles.

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CHEMICAL NOTES.

INFECTION.—At a recent discussion in the English Parliament in regard to sanitary inspection, one of the members stated that the Committee of the Privy Council had recommended the medical officer, before surveying a house, to have on a particular dress, consisting of "strong water-tight boots, reaching to the keees, and greased all over, a water-proof coat closely buttoned up to the neck and at the wrists, and the head covered with a cap which takes the hair well in." The member hoped the medical officer would be clothed in this safety dress before he embarked in the dreadful danger of visiting these nuisances; especially as he had to report to the nuisance authority; or, going into these pest houses, he would himself come out pestiferous. It was the more necessary that there should be a definition of "infection," from the visitation of cholera with which we were threatened. He had formerly asked a question on this subject, and referred to the fact that the Emperor of the French had been visiting the cholera hospitals in Paris. There was also the experiment mentioned in the newspapers of a young student, named Jerard, who, to show that cholera was not infectious, took the perspiration off the forehead of a dying man and the fur off his tongue, and put them in his own mouth. It was announced that the Emperor of the French had for the second time visited the cholera patients in the hospitals at Amiens.

CAPILLARY ATTRACTION.—At a recent sitting of the Academy of Sciences, M. Chevreul gave an account of some experiments illustrating what he calls capillary affinity. He made a paste of white lead and water, and another of white lead and linseed oil, and placed them in separate tubes. Above the oily paste he placed water and above the watery paste oil. The oil in the latter case displaced the water, but water did not displace the oil in the former. In corresponding experiments with clay and pure kaolin it was found that water would in each case drive out oil, but oil would not drive out water.

PURIFYING WATER.—Mr. Bird, of Birmingham, has patented the use of the neutral sulphate of alumina for purifying water. Its action depends upon the presence of carbonate of lime in the water to set free hydrated alumina, and as carbonate of lime is almost universally present, the process is as universally applicable. The advantage of the use of this compound is, that beyond converting carbonate into sulphate of lime it introduces no new salt, while the organic matter is carried down with the hydrated alumina.

DESTROYING RATS.—M. Cloez entertained the Academy with a mode of destroying rats and other animals that burrow. The Museum of Natural History at Paris is, or rather was, dreadfully infested with rats, but, thanks to M. Cloez, it is now free from the nuisance. The happy thought of pouring bisulphide of carbon into the holes occurred to this gentleman, and the vapor, we need hardly say, was fatal to all the rats who stopped to inhale it.

SOIL AS A DEODORIZER.—Dry earth, sprinkled over the contents of a vault, is said to be a good deodorizer. The top soil, exposed to the sun, or dry loam, sprinkled or shoveled on the contents of a privy every day or two, will prevent the exhalation of offensive odors, and vastly increase the value of the contents as a fertilizer.

IT is said that the English doctors have for some time past been engaged in an interesting series of experiments with a view of testing the poisonous qualities of the flesh of cattle who have died of the rinderpest. The doctors collected a number of dogs and fed them on this meat exclusively, in some cases giving them the most diseased portions. The dogs like it, and have got fat on their generous diet, and the doctors are completely nonplussed.

A CHEMIST suggests that to avoid accidents in the transport of nitro-glycerin, so useful in mining, that when used in stone quarries it should be manufactured on the spot when wanted.

LUCK lies in bed, and wishes the postman would bring him news of a legacy. Labor turns out at six o'clock, and, with busy pen or ringing hammer, lays the foundation of a competence.

MISCELLANEOUS SUMMARY.

SOME young apple trees and heath plants were sent out to Australia in the ice-well used for the transportation of salmon ova. They were in perfect health when they arrived, and suitable for planting.

PROF. AGASSIZ says he found the valley of the Amazon uncommonly fertile, and its climate very healthy. It is his opinion that it will one day become the mart of the world, supporting in comfort 20,000,000 of inhabitants.

THE total value of the prizes to be given at the forthcoming Paris exposition is $160,000 in gold. The jurymen to decide upon the merits of articles sent from United States are to be selected by the United States Commissioners.

DIAMONDS have been found in Georgia, Hall Co., which have been examined and proved to be of real value. They were discovered by Dr. F. M. Stephenson, at a place where miners had been at work, and had the external appearance of worthless pebbles.

IN the district of which Moscow is the center, there is an immense coal bed, covering an area of 120,000 square miles, and in the region of the Don River there is also an enormous coal bed. The Moscow coal basin is said to be as large as the entire bituminous coal area of the United States; while the coal basin of the Don is more than half as large as all the coal measures of Great Britain.

MR. R. MUSHET states, in a letter to an English journal, that one of his improvements will, in conjunction with Bessemer's pneumatic process for producing steel or highly refined iron, return an annual revenue of one million dollars. He also states that "one of his patent processes alone is at present of more commercial value than all the patent processes (with two exceptions) collectively, for the improvement of iron and steel, taken out by others during the present century."

NATIONAL BANK CURRENCY.—As there are at present so many counterfeit and altered National Bank notes in circulation throughout the country, we publish the following list of designs on the back of the genuine notes: $1000 notes, Washington resigning his commission; $500 notes, Surrender of General Burgoyne; $100 notes, Declaration of Independence; $20 notes, Baptism of Pocahontas; $10 notes, De Soto discovering the Mississippi; $5 notes, Landing of Columbus in 1492; $2 notes, Sir Walter Raleigh, 1585; $1 notes, Landing of the Pilgrims. All National Bank notes the backs of which do not correspond with the above, are bogus.—*Shipping and Commercial List.*

AMERICAN MILITARY INVENTIONS.—Russia takes a very great interest in the improvements in military science lately made in this country, and has sent an officer of the Royal Russian Mining Engineers—Capt. Kholostoff by name—on a tour of inspection throughout the United States, with instructions to make monthly reports to the home Government. He has visited the armory at Rock Island, Ill., and lately witnessed the casting of the twenty-inch gun for the *Puritan*, at Pittsburgh. At present he is in St. Louis, and it is said has arranged with the inventor of the Rodman gun to furnish some of that kind of artillery to the Russian Government.

FACTORIES SOUTH.—An Alabama paper says:—"We hear of factories springing up all over the country. At Camden, Wilcox county, a wealthy company have taken the initiatory steps to erect a large building, and fill it with the most approved machinery. At Carrollton, Miss., a factory is now in operation, which in a short time will employ one hundred and eighty spindles. In Marengo county they are making arrangements to manufacture on a large scale. At Cuba Station, Sumter county, a factory is shortly to be in operation. These are a few of the indications that the South will soon become filled with factories. The results of the war, in throwing capital into an entirely new channel, the facilities of easy intercommunication, abundance of material to be used in manufacturing, contiguity to the said material, equability of temperature, and a thousand other facts, point out this region as the future home of the factory."

Correspondence

Theory of Tornadoes.

MESSRS. EDITORS:—I happened to cross the ferry at Havre de Grace in the evening immediately after the railroad bridge, now in course of construction there, had been destroyed by the tornado of the 25th of last month, and it struck me that the effects were not such as we should expect from air currents or strong winds alone. These could not possibly displace so well-constructed frameworks of small surface, through which the wind easily passed in all directions. The ruins of the bridge illustrated, on an immensely large scale, what we see on a small scale in the lecture room experiments about electric attraction and repulsion. Almost everybody knows the experiment of the dancing figures—light wooden or paper objects, placed on a brass plate, connected with the earth, are lifted up, thrown down, projected indiscriminately around, or piled up, by the attraction of an isolated brass plate, charged with electricity, and placed at a short distance above them.

If we now imagine the surface of the water at the mouth of the Susquehanna River, or rather the Chesapeake Bay, to represent the lower plate, a layer of clouds, charged with electricity, the upper isolated plate, and the timbers of the bridge the figures made of matches, paper, or other light materials, we have the exact similar conditions, only enlarged, and we may easily explain the lifting up of the arches and the throwing down of the same from the isolating piers. The upward rush of wind, of course, assisted to produce these effects, but these winds are also caused by the electric attraction of the clouds, which, during a tornado, not only lift up all kinds of heavy objects, but also attract air, and thus cause upward whirling currents, which naturally assist in raising trees, houses, and even large columns of water. The latter phenomenon is known under the name of waterspout.

The tornado in question took place, as always, during a severe thunder storm, this time extending along the Atlantic coast from Massachusetts to South Carolina. In the same way as these effects may be annihilated on a small scale, by placing pointed conductors upward between the figures lying on the lower brass plate—say pins or needles—touching the lower plate, and thus discharging the electricity quietly, so we may obviate the destructive effects of tornadoes a great deal, and perhaps entirely, by placing lightning rods, with their lower extremities carefully connected with the water, over such a bridge. Two rods on each pier would be sufficient, one at the right and one at the left. Those rods would attract the positive electricity from the clouds, and discharge it in the ground; or, if we adopt the dualistic theory, they would also discharge the negative induced electricity from the ground or water upward, and thus neutralize the positive-electric clouds. The neighborhood of strong positive-electric clouds makes the parts of the earth under them strongly-negative electric, which latter charge is called an "induced" electricity.

A few years ago, a certain Mr. Peltier proved (see Prof. Henry's Report, Smithsonian Institute) that the earth is almost always negative-electric, but he did not explain why this is so; that, consequently, the clouds are mostly positive-electric by induction. Pouillet demonstrated, however, long before (about thirty years ago), that the vapors of saline water are always positive electric, thus conclusively settling the question that the vapors continually arising from the surface of the earth, of which three-fourths are saline, must be positive-electric, and, consequently, the earth's surface negative. It is true that Faraday has made some counter experiments, to disprove Pouillet's theory, but when we fairly compare and repeat the series of experiments of both these eminent *savans* on this subject, we are compelled to adopt Pouillet's ideas.

It is a curious fact that, in America, the land where the lightning rod was invented, there are fewer lightning rods than in Europe; and, what is worse, many are so poorly and carelessly constructed, that, in place of giving protection, they increase the

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danger, even in this city of Benjamin Franklin, where he made his world-celebrated kite experiment.

I close with expressing the hope that one of the greatest scientific discoveries the world ever saw, may be appreciated, and more universally applied to the protection of life and property. What is the expense of a well-constructed lightning rod, compared with the loss its absence may originate?

The damage of the above-mentioned bridge is estimated at about half a million dollars.

P. H. VAN DER WEYDE, M. D.

Philadelphia, Aug. 16, 1866.

P. S. After finishing this paper, I found an account of an aerial voyage among the clouds during a thunder storm, made in Ohio, in 1852, by Mr. Wise, in which he had occasion to observe the formation, by electricity, of an uprising whirlwind or tornado, and also of hail stones. A hail storm is acknowledged, long ago, to be an electric phenomenon, and lightning rods have been suggested to be raised on a kind of telegraph poles, at regular distances, in districts subjected to destructive hail storms. They are said to be partially, and in some localities, perfectly successful. P. H. V. W.

A Simple Code of Signals Wanted.

MESSRS. EDITORS:—Will you permit me to improve the opportunity, while there is considerable interest among your readers on the subject of "Cryptography," to make a suggestion which, if followed up, would, without doubt, result in great practical good. This suggestion is, that a formal request be made of the Signal Bureau of the War Department, asking that a simple code of signals, on the general plan of those used during the war, be made public for general use. This request, if made by some of our scientific or commercial associations, or by a few of our citizens who are known to be specially interested in the promotion of science, would, I think, be complied with.

The utility and novelty of such a code would soon bring it into general use. It would furnish a pleasant pastime in our schools, as well as an agreeable exercise. It would be taught at our military and naval academies, and would become an accomplishment which would be sought by all.

Let me suggest a few of its uses. A manufacturer, residing a few miles from his establishment, could thus receive a daily report from his business without a personal visit. In the construction of bridges, communication could be carried on across large rivers, and to piers or islands situated in the middle of the stream. During excursions for pleasure or for scientific objects, the power of signaling a few miles would often be a great advantage. In cases where human beings are separated by fire or flood from their fellow men, how often would such a power be an immense saving both of life and treasure. If every vessel which sails from our ports were obliged to carry such a code with them, and to furnish themselves with a set of signal flags and torches, vessels could thus communicate at sea without the detention caused by the present mode; the present cumbrous signal paraphernalia of our navy could be dispensed with; and in cases of shipwreck a simple system of signals, universally known, would prove invaluable.

By means of the fog trumpet or steam whistle, communication could be kept open during foggy weather. According to the report of Prof. Henry before the American Academy of Science, a steam whistle has been invented which can be heard thirty miles. As far as sounds could be clearly and distinctly made, their meaning could be readily interpreted. Signals with flags have been read twenty-five miles with the small signal telescopes used in the army.

Such a code would be in no manner dangerous to the present cipher signal used in the U. S. Army. It might be made an international code, and thus by means of dictionaries, which could be carried on shipboard, communication could be had in all languages. That such a code will be adopted at some future time, I doubt not, and that the subject has already been broached at Washington, I am certain. I think I cannot be mistaken in asserting it would meet the approval of Col. A. J. Myer, to whom the country owes the perfect system of signals which has been of such incalculable benefit during the late war. That it has, in fact, been a favorite idea with him for years, I can with safety assert. The present head of the Signal Bureau at Washington is Col. B. F. Fisher, who, as a practical signalist, has no superior in the country. That he would favor a project promising such auspicious results I have little doubt.

GEO. C. ROUND,
Late Lieut. and Signal officer U. S. army.
Windsor, N. Y., Aug. 15, 1866.

Lightning-Rod Insulation.

MESSRS. EDITORS:—I am glad to see you are ventilating the subject of lightning rods, for it greatly needs it, to save the community from swindlers, and to protect its lives and property. In your last article you say "some advocate insulation, and some argue against it," although it is plain from your former article that you agree with most scientific men, that it is desirable. But the question arises, what is insulation? In your first article you say, "passing the rod *through* glass insulators does not seem to be always effective," and yet nine-tenths of the rods peddled through the country are put up with such glass rings, and are called insulated rods. Hence the prejudice against insulation, and with many against all rods. They see the failures, and not knowing the cause, condemn indiscriminately. As well might they condemn all medical treatment of disease for the same reason. A properly insulated lightning rod should never pass through the glass, nor come in contact with it, for when a bolt of electricity, following a rod, comes in contact with a body of glass, it is very sure to shatter it, leaving the rod in contact with the staple or strap which held the glass to the building, in which case the rod is no better or worse than a rod put up without insulation, and fastened with staples directly to the building, which rod *may* conduct the bolt safely off, but is dangerous if overloaded, or improperly entered in the ground, or if its connections are the least impaired. A few years since, the house of Mr. Conrad Swackhamer, at Fort Washington, was furnished with lightning rods which were supported by being wired to the outer end of glass knobs. The rod was struck and the glasses were shattered all over the house, but as there were no surrounding staples or straps for the bolt to follow into the building, it passed safely to the ground. Mr. S. having learned wisdom by experience, procured insulators to repair his rod which do not permit the rod to impinge upon the glass. By this example we see the necessity of not only insulating the rods, but of preventing all contact of rod with the glass used for insulation, and we see also the reason for the frequent failures of glass-ring insulators. J. D. WEST.

Pickling Castings.

MESSRS. EDITORS:—I don't propose to give your readers any thing new about this common subject, but to give a caution as to what is done with the pickle when exhausted or saturated so as to render it useless for the purpose for which it was originally intended.

On a recent occasion I was called to apply the indicator to a steam engine, to determine its power, and proportion it between landlords and tenants. I observed uncommon evidences of some destructive agent on the piston rod and other parts exposed to the action of the steam and water. After concluding the indication I got a specimen of the water used, which was from a well in the yard. On testing it by the taste my suspicions were confirmed that the destructive action was from the water. I applied a test for iron and found it in abundance. I applied a test for acid and found that also.

On further inquiry I found that when the engine was first started in February last, the water was considered of superior quality, perfectly palatable and soft; that in April it began to get bad, not drinkable, and would not do to wash with. This led me to suppose that the cause of deterioration was extraneous and not inherent in the source. Further investigation brought out the fact that the castings used in the manufacturing of machinery were pickled and washed off in the yard around and about the well, and the ground being sand, the pickle saturated with iron readily found its way to the well.

It will be remembered that from February to April the water was good; but when the frost left the ground the saturated pickle, sulphate of iron, easily found its way through the sand to the well.

This is the second case that has come under my observation. The first case was more destructive, in consequence of the great quantity of sulphuric used, five carboys in a week, which entirely destroyed two boilers of sixty horse-power before the cause was discovered. F. W. B.

NEW INVENTIONS.

The following are some of the most prominent of the patents issued this week, with the names of the patentees:—

CLAMPING AND STRETCHING SEAMS.—ELIJAH SHAW, Milwaukee, Wis.—This invention relates to a useful device for clamping and stretching fabrics, or any substance connected by sewed or stitched seams, for the purpose of enabling the edges of the fabric, adjoining the seam, to be burnished or rubbed down, and also trimmed with great facility. This work has hitherto been performed exclusively by hand, involving a considerable expenditure of time, and materially augmenting the cost of manufacture, especially the manufacture of shoes, the operating upon the seams of the uppers of which this improvement is more especially designed for.

VENTILATING BOOT.—SAMUEL PERRY, New York City.—This invention consists in forming a canal or channel between the inner and outer soles of the boot, the canal communicating with the interior of the boot through numerous holes formed through the inner sole, and with the air through tubular canals having orifices through the upper of the boot or shoe.

LETTER SCALE.—R. MURDOCK, Baltimore, Md.—The top of the beam of this scale is made flat, and the notches and figures denoting the weight are made on the same, instead of on the sides of the beam, as in the ordinary letter scale, thus facilitating the reading of the weights.

GLASS PRESS.—HIRAM DILLAWAY, Sandwich, Mass.—This invention consists, among other things, in a novel mode of operating the plunger or followers of the press to obtain the requisite degree of pressure upon the glass within the mold.

LOCK.—G. M. WOOD, Decatur, Ill.—This invention relates to a new and improved mode of operating a sliding latch and locking the same, whereby, it is believed, several advantages are obtained over the ordinary sliding latches now in use.

BRICK MACHINE.—ROBERT L. WALKER, Globe Village, Mass.—This invention relates to a new and improved machine for pressing and molding brick, and has for its object the pressing and molding of the bricks with rapidity in a very compact manner, and with a smooth and finished appearance.

HAY-LOADING DEVICE.—HOSEA WILLARD, Vergennes, Vt.—This invention relates to a new and improved attachment to be applied to wagons or carts, for the purpose of loading the same with hay as they are drawn over the field, thereby avoiding the manual labor of pitching and raking the hay up into cocks. Various devices for this purpose have been devised, but they have not been generally adopted on account of being cumbersome, liable to get out of repair, and incapable of being adjusted so as to rake nearer to or further from the surface of the ground, as occasion may require, and admitting of the hay, during its elevation from the ground on the wagon or cart, being scattered by the wind, difficulties which, it is believed, are fully obviated by this invention.

HOP-VINE SUPPORT.—N. C. ROBERTS, Burlington, N. Y., and E. W. BADGER, Otsego, N. Y.—In this invention a series of posts are set into the ground, with horizontal rods running from top to top. From the first series of posts others are elevated, and are supported in their upright position by horizontal wires extending between high posts, the whole weight of the secondary posts, with their contents, resting upon the primary posts.

FIRE OR CINDER TONGS, ETC.—SILAS D. YERKES, Downington, Pa.—This invention consists in so constructing the tongs that they can be used as a poker or a lifter for stove covers.

HORSESHOE.—WILLIAM LITZENBERG, Macomb, Ill.—This invention consists of an improved horseshoe formed by combining with the main part of the shoe heel and toe calks, so constructed with double flanges, that when one flange has become worn and dull the calks may be reversed, and the other flange used, and which may be removed and replaced with new calks, without removing the main part of the shoe from the horse's foot.

APPLE PARER AND CORER.—HENRY SELICK, Lewistown, Pa.—This invention consists in an improved machine for paring, coring, and quartering apples at one operation, by means of which the work may be done quickly and well.

BOTTLE STOPPER.—FREDERICK MILLER, Newark, N. J.—This invention relates to a new and improved stopper for bottles, whereby the use of corks, and the labor of using the same, are avoided. The invention is more especially designed for bottles for holding soda water, porter, and other liquids impregnated with carbonic acid gas, and which require to be uncorked expeditously in consequence of their contents being sold over a counter for immediate use.

BROOM HEAD.—M. W. OWENS, Waterford, Pa.—This invention consists, principally, in combining the wooden head, the metallic clasps, and the bars and bolts with each other, and with the corn of the broom, the wooden head being constructed with a groove for the reception of the upper edge of the clasp, and with an expanding tenon, which enters the upper part of said clasp.

WATER-ELEVATING DEVICE.—DANIEL FLAGG, Concord, N. H.—This invention relates to a new and useful device for assisting in elevating water from wells, cisterns, etc., etc., and consists in having an air chamber connected with the lever end of the suction pipe of a pump, whereby the pressure of the air within the chamber is made to counteract, in a certain degree, the gravity of the water, and thereby greatly aid in elevating the same.

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FRAME FOR TRAVELING BAGS.—LOUIS FRUHINSFELD, Newark, N. J.—This invention relates to a new and improved metal frame for traveling bags, and consists in constructing the bars of which the jaws of the frame are composed, of curved or bent form in their transverse section, so as to insure lightness with strength, and also in having the ends of the jaws of taper form, or gradually decreasing in width from points above the rivets down to the same, whereby the cloth, leather, or other material of which the bag is constructed, will not be liable to be torn by the ends of the jaws as the latter are opened and closed.

BED-BUG TRAP.—EZRA B. LAKE, Bridgeport, N. J.—This invention consists in a circular cup orbox, to be placed under the feet of the bedstead, the interior of which is divided into three concentric, annular compartments by low partitions, the intermediate compartment containing poison powder, and the others, attractive powder. The top edges of the outer sides project inward over the poison, so that the bugs, in endeavoring to reach the bait, will fall into the poison.

ROOF.—CHARLES S. CLARK, Huntsburgh, Ohio.—This invention consists in forming the roof with four or more gables and four or more ridges, the ridges meeting in a peak at the center.

WATCH.—SMITH D. FRENCH, Wabash, Ind.—This improvement consists in a new escapement for watches, wher in the pallets are drawn upon a curve from the staff of pallets as a center, the teeth of the escapement wheel playing or striking on the concave side of the pallets.

STEAM VALVE.—JAMES B. WOOD, Lansingburgh, N. Y.—By this invention many important advantages are obtained, such as cheapness and simplicity.

SCREENING AND WEIGHING DEVICE.—W. H. TAYLOR, Pittsburgh, Pa.—This invention relates to a new and useful device for screening and weighing, simultaneously, coal, limestone, and other similar substances, as they are delivered on shipboard, or put into vehiclesto be transported to the place where they are to be used. The object of the invention is to economize in labor and time, now largely expended in manipulating for screening and weighing heavy substances of the kind specified.

EVAPORATOR.—WM. H. ISAACS, Terre Haute, Ind.—This invention consists in providing the pan with suitable holders against which to strike the inverted skimmer, to remove the warm scum, and on whicli to rest it to drain when temporarily disused, and also in the arrangement of holders and recesses for retaining the skimmer in a proper position in the pan.

HORSE HAY FORK.—A. J. LAIRD, Middleton, Pa.—The upper horizontal part of the bent tripping lever, when the fork is locked in position for retaining and hoisting its load, is passed through the eye at the upper end of the fork, and the tripping rope connected to the end of said lever, also passing through the eye by the side of said horizontal part of the lever, it is caused always to act thereon in the same direction for tripping the fork.

BEE-HIVE.—LEVI W. ABBEE AND SIMEON W. ABBEE, South Charlestown, N. H.—This invention relates to a new and improved bee-hive, and consists in a novel construction of the same and in a peculiar arrangement of its parts, whereby many advantages re obtained and superior facilities afforded for bee culture.

SPICE HOLDER.—A. J. WALKER, Lowell, Mass.—This invention relates to an extremely useful, convenient and desirable utensil for household purposes. It consists of a wheel, divided into several boxes to receive the various spices, or condiments used in cooking, such as cinnamon, ginger, etc., and so arranged that it can be revolved, for bringing any one of its several boxes in line with an opening made in the stand, when desired to use the spice or condiment contained in such box, or to refill the same.

LETTER FILE.—FREDERICK ASHLEY, New York City.—This invention relates to an extremely simple and cheap file for letters, mem randums, bills, etc., and for use in counting rooms and offices it seems to be a very desirable, convenient and useful device.

JAPANNED FABRICS.—JOHN FLETCHER, Newark, N. J.—This invention relates to a fabric which is intended as a substitute for japanned, or what is generally known by the term "patent," leather. The fabric is composed of muslin, silk, leather, or other suitable material, which is combined with tissue or other suitable paper, and coated with the ordinary leather japanner's varnish, in such a manner that a cheap and durable fabric is produced, which can be used in many cases with great advantage in place of patent leather.

BUTTONHOLE CUTTER.—WM. LIEBER, New York City.—This invention relates to a buttonhole cutter, the knife of which is guided in a suitable guide groove formed by a bracket extending from the handle, which also connects with the arm, on which the anvil is fixed, in combination with a lever handle, the fulcrum of which is close to the knife, and on its outside end, which is provided with a stud catching in a slot in each knife, in such a manner that the cutting edge comes down flat upon the material to be cut, said edge being parallel with the face of the anvil, whether the knife be raised or lowered.

MITERING MACHINE—FRANK A. HOWARD, Belfast, Me.—This invention consists in a mitering machine, which is composed of a transversely sliding head, provided with one or more hinged adjustable cutters, in combination with rests, which are adjustable in segmental slots, in such a manner that for the purpose of mitering edgewise the rests can be adjusted to any desired angle, and for the purpose of mitering flatwise, the knife or knives are brought in the desired inclination, and any required angle can be given to a strip of wood or molding.

COMPOUND UNIVERSAL CHUCK.—ROBERT ROSS and THOMAS ROSS, Middleburg, Vt.—This invention relates to a chuck, the jaws of which are combined with suitable gearing, in such a manner that the same can either be moved simultaneously, or each independent of the other, and can be used for clamping pieces of metal, wood, or other material, concentrically or excentrically, as may be desirable.

HYDRANT.—JAMES M. WARD, New York City.—This invention relates to a new and useful improvement in hydrants, whereby a hydrant is produced which is simple and efficient, and is not liable to get out of order.

WASHING MACHINE.—CHARLES A. CODDING, Battle Creek, Mich.—This invention consists of a friction roller and a rubbing apparatus, provided with an elastic device, and used in connection with a suds box and bed of rollers, upon which the clothes are laid.

CHILDREN'S SLED.—N. P. LINDERGREEN, Boston, Mass.—This invention consists in arranging upon each runner of the sled a lever of such a form that either one or the other, or both at once, can be brought to bear upon the surface over which the sled is moving, according as may be necessary, to direct the sled either to the right or left, or retard or stop its movement.

OIL DISTILLING APPARATUS.—JAMES B. GRANT, New York City.—This invention consists in introducing heating pipes of peculiar construction into petroleum stills for the passage of heat through the mass of the oil, as well as at the bottom and sides of the still, thus largely increasing the heating surface and distilling the oil more rapidly. In connection with this improvement there is an improved condensing pparatus.

MITER BOX.—GEORGE KEATING, Thomastown, Me.—The object of this invention is to furnish an adjustable miter box for sawing obtuse and acute angles in bevel work or moldings for frames of rhomboidal form, by which all the corners may be cut in succession at the proper angles for fitting together perfectly.

FILLING MOTION FOR LOOMS.—ADAM MARCHINGTON, Upland, Pa.—This improvement relates to the filling motion of power looms, and consists in a novel arrangement of devices for unlocking the shipper and moving the belt on to the loose pulley to stop the loom.

FRACTURE BED.—M. M. LATTA, Goshen, Ind.—This invention was illustrated in SCIENTIFIC AMERICAN, on page 255, vol. xiv.

TREATING ORES.—W. L. RAHT, Baltimore, Md.—This invention relates to a new process for treating matte or regulus run from metalliferous ores containing sulphur, arsenic, or antimony, and consists in forcing atmospheric, air, or other gas, through the liquid fused matte obtained from such ores, in such a manner that by the air or gases the sulphur or arsenic or antimony contained in the matte is vaporized, and a pure metal is obtained.

RAILROAD CHAIR.—W. M. MARTIN, New York City.—This invention consists of a chair, which when applied to the rails forms a tapering socketto receive a wedge-shaped supporter which fits the neck of the rail and rises to a level with its upper surface, in such a manner that by said wedge the tread of the rails is strengthened, and at the same time the wheels of the engine and cars are enabled to pass the joints of the rails without depressing their ends.

FLUTING IRON.—CHARLES A. STERLING, New York City.—This invention relates to a fluting iron consisting of a flat, corrugated bed and a segmental corrugated presser, the corrugations of the presser being made to match with those of the bed, in such a manner that by the combined action of the bed and presser textile fabrics or other flexible materials can be fluted with the greatest ease and facility.

SPINNING WHEEL.—H. KOELLLER, Camp Point, Ill.—Thisinvention relates to a hand spinning wheel, which is mounted on a swivel standard, secured by a screw pivot to a screw clamp, and furnished with a forked arm, which forms the bearing for the spindle, and which is adjustable independent of the standard, in such manner that the distance between the spindle and the pulley, from which it derives its motion, can be increased or decreased for the purpose of tightening or releasing the belt; and, furthermore, the driving wheel can be adjusted to any convenient hight to suit the stature of different persons, or the position in which they may desire to operate the spinning wheel.

TICKET REGISTER.—GEORGE R. SOLOMON, JR., and JOSEPH SOLOMON, New York City.—This invention relates to a new and useful ticket box or register for conductors on railway cars, and for ticket-selling use generally, in which the tickets, in a continuous strip, are wound upon a central drum or shaft, and the box then locked by the superintendent or other authorized person, so that the ticket strips cannot be tampered with or changed, and the conductor or seller cannot have access to the box, but is able to produce tickets therefrom as required by suitable mechanism in connection with the box.

AIR CARBURETING MACHINE.—HUGH L. MCAVOY, Baltimore, Md. Patented August 14, 1866.—This machine is ingeniously contrived to obtain the maximum result with a given driving power. The automatic arrangements for the regulation of the flow, and the thorough carbureting of the air, will, no doubt, recommend it to the attention of the public.

Notes and Queries

P. E. C., of Baltimore.—We cannot tell you where you can get a piece of the Atlantic cable. There is a specimen in this city, but not for sale. The cable is one and one-eighth inch diameter.

C. W. C., of Mo.—We cannot give you the relative strength of stone, brick, and concrete for building purposes. The conditions of its use vary so much that no invariable rule can be given. For such a building, however, as you propose, we could not advise concrete. Mahan, in his "Civil Engineering" says: "Experience has shown that for buildings concrete possesses neither the durability nor the strength requisite for structures of a permanent character, when exposed to the action of water, or of the weather. It is very inferior in strength to good bricks, and the weaker kinds of natural stones."

H. C. D., of W. Va.—To make a cheap filter for your river water, take a cask provided with a stop cock, and put in the bottom gravel or pebbles to the depth of a few inches, then one or two thicknesses of flannel, next a few inches of charcoal, and lastly fill up nearly to the top with clean sand, and the filter is ready for use.

H. M. D. of Ct.—There are processes for bleaching vulcanized india-rubber white. We have seen such samples.

G. C., of N. C.—The best method of coating iron, or any other metal, with silver, is by the electro-galvanic battery, but we presume you would prefer the style which is capable of more extended and diversified use. This consists in covering the iron with soft solder, and then, with a soldering iron, or heated burnisher, attaching the foil to the solder by partially fusing the solder. Care must be taken to avoid heating the solder too much, as the silver might be melted and incorporated with it. This plating will not resist much heat, but for mere ornament is effectual and lasting. Second—We do not wish to express an opinion as to the rel tive merits of the engines of different makers. We do not, however, recommend the machine you refer to. A cheap engine is seldom a good one. Pay a fair price and get a serviceable machine.

W. J. C., of La.—We never found any difficulty in hardening and tempering planing-machine knives. Heat them in a "long" fire, so the steel will be brought, for the whole length, to the proper temperature at the same time. Be sure to have an even heat, and then with a pair of tongs at each end, dip the edge horizontally in pure cold water. After rubbing the oxide off the steel, there will be heat enough in the iron back to "draw" them. If not, use red hot iron. There is no difficulty in cutting them. The iron backs can be cut with a cold chisel, and a mark across the steel with a sharp edged file will insure a straight fracture.

G. M., of N. Y.—We are not aware that there is a cheaper source of pure olefiant gas than alcohol. The gas is condensed into a liquid at a pressure of 26.20 atmospheres when the temperature is maintained at 32 deg. Fah.

A. D., Jr. of——.—Varnish is sometimes used as an insulator upon the wire of helices, and we think it likely that collodion could be employed. Try it.

W., of Ct.—A rainbow is the result of the decomposition of the light of the sun on passing through the rain drops. The sun, the eye of the observer, and the center of the circle of which the bow is a part, are always in the same straight line. The colored rays which reach the eye always make the same angle with this line, and hence the circular form of the bow.

SPECIAL NOTICES.

Erasmus A. Pond, of Rutland, Vermont, having petitioned for the extension of a patent granted to him the 7th day of December, 1852, for an improvement in pill making machines, it is ordered that the said petition be heard on Monday, the 19th day of November next.

NEW PUBLICATIONS.

UNITED STATES CENSUS.

Messrs. Woodworth & Lawton, Cambridge, N. Y., have published, for the use of patent-right and business men ge erally, a neat volume of 174 pages, which gives the population of each State by counties, cities, and towns. It is a very convenient and useful volume. Price, in paper, 60 cents, or in tuck form, $1, sent by mail. It contains a chapter on "How to Sell Patents."

PRACTICAL GUIDE FOR THE MANUFACTURE OF PAPER AND BOARDS. By A. Proteaux.

This treatise is a translation of Proteaux's work, which is quoted as authority in France. It contains also selections from Le Normand's "Nouveau Manuel," and a chapter on the manufacture of paper from wood in this country. It is an able and valuable treatise, giving the history of paper making, and detailing the modern processes of producing paper from various materials, illustrated by plates and plans. We commend it cordially to paper manufacturers, who cannot fail to derive valuable information from its pages. The progress of paper making in this country is such that we think our own manufactories might furnish sufficient material for an interesting and valuable volume on the art. We would like to see the attempt made.

The work is published by Henry Carey Baird, No. 406 Walnu street, Philadelphia.

MECHANICAL PERIODICALS.

From John Wiley & Son, No. 535 Broadway, we have received Part 10 of "Locomotive Engineering," by Zerah Colburn, London; and Parts 29 and 30 of "Shipbuilding." Both valuable aids to the workman, the manager, and the proprietor of concerns in which the respective businesses may be carried on. Part 10 of Bourne's excellent "Treatise of the Screw Propeller" is also at hand. It is a repository of great value for reference as well as for practical information.

INTERNAL REVENUE LAWS, as amended and approved up to July 13, 1866. Compiled by Horace Dresser.

Messrs. Appleton & Co., No. 443 Broadway, have just issued the above very valuable compilation of laws, which are of interest to every tax-paying citizen.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as a fee for copying. We can also furnish a sketch of any patented machine to accompany the claim, at a reasonable additional cost. Address MUNN & Co., Patent Solicitors, No. 37 Park Row, New York.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgment of the reception of their funds.

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The Celebrated Needle Gun.

We give an engraving of the principal working parts of the Prussian needle gun, which has been so much talked about in European and American journals. Shortly after its adoption by the Prussian Government we published a description, with engravings, of the arm, but in the present engravings we give in detail the working parts. Fig. 1 represents the breech piece, with its parts partly in section, contracted longitudinally. In fact, this breech piece is eleven inches long. The case, A, is screwed to the breech of the barrel, which at this point is bored out for a cartridge chamber, to the depth of the lands or grooves in the barrel proper.

Fig. 1

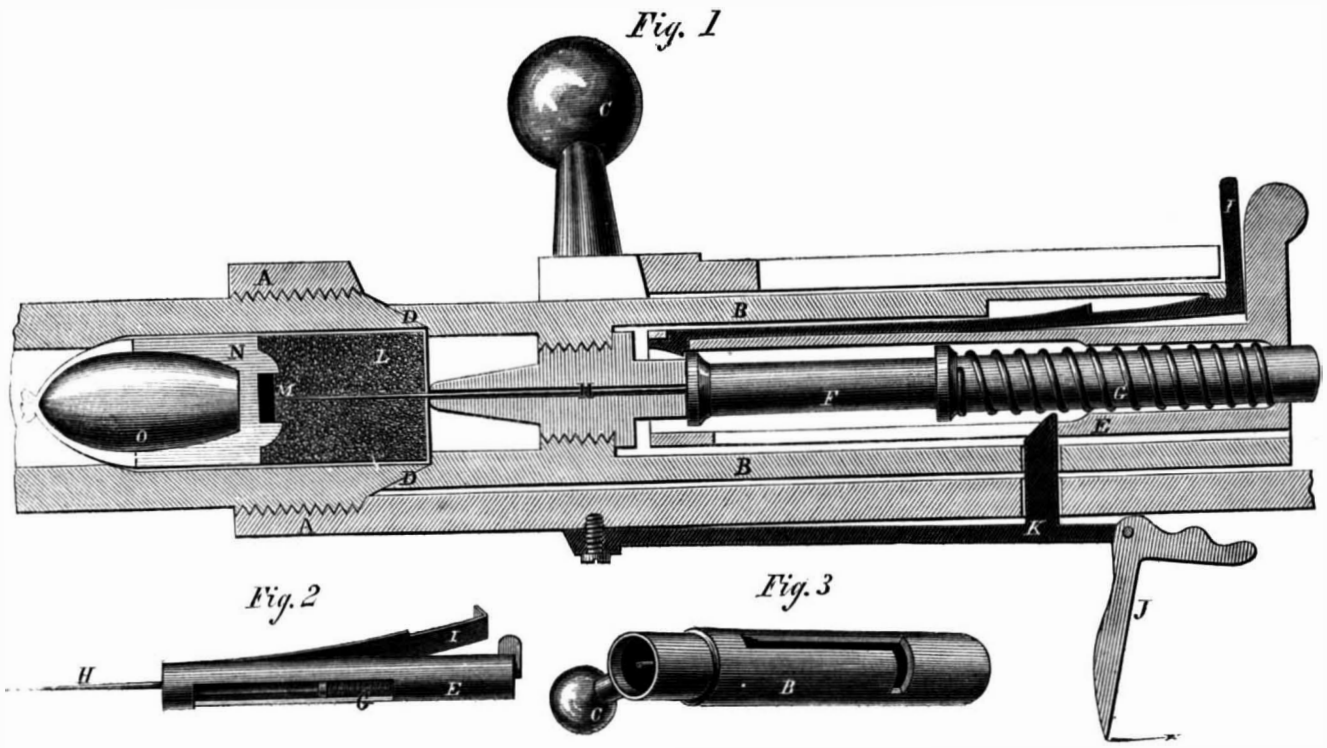


Fig. 2

Fig. 3

THE PRUSSIAN NEEDLE GUN.

Inside this case is a cylindrical chamber, B, furnished with a handle and knob, C, which can be moved along a longitudinal slot in the case, having a transverse slot inclining toward the forward or muzzle end. This chamber is convexed or bored at the end, and fits over the conical end of the barrel at D. A sharp blow of the hand on the knob forces its shank into the spirally-transverse slot, and effectually closes the joint at D. Inside the chamber is a cylinder, E, containing the needle bolt, F, the spiral spring, G, and the needle, H. At H is also a plug, or guide, screwed to the inside of the chamber, B. On the apex of this the cartridge rests. A spring, I, with its end catch, serves to withdraw the cylinder, E, with the bolt, F. The trigger, J, is a bell crank lever, which depresses the spring, K, and allows the cylinder and contents to be drawn to the rear. L is the powder, M, the percussion wafer, N, the *sabot*, and O, the bullet, all enveloped in paper.

The operation of this mechanism is easily understood. The spring, I, being pressed, unlocks from the case, B, and allows the sliding back of the cylinder, E, so that the rear projection of the bolt, F, takes the spring, K, and the needle is withdrawn into its guide or sheath, H. The chamber, B, is then unlocked by the knob, C, and slid back so that the front projection of F catches the spring, K, thus compressing the spiral, G. The rear of the barrel is thus opened and the cartridge can be introduced.

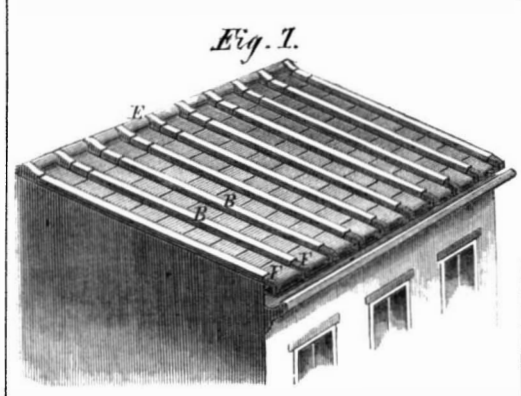
The chamber is then moved forward and locked against the barrel, and the spring, I, is pressed down and the needle bolt moved forward, so that the rear projection rests against the spring, K, and the needle rests against the rear of the cartridge, and the piece is ready for firing. The front of the needle bolt is recessed, and receives a leather washer, designed to prevent the escape of the products of the gas combustion to the cylinder, B, an office it performs but inefficiently. The remarks of our correspondent in last week's issue, showing the inferiority of this arm when compared to our breech-loaders appear to be just and correct.

The *sabot* at the base of the projectile is made of a slip of paper coiled tightly into a disk, compressed, and secured with paste. It is intended to receive the fulminating wafer, and to offer a wad of resistance between the powder and ball. It is also claimed that it cleans the grooves of the rifle at each discharge. The paper cartridge which envelopes powder, *sabot*, and bullet, frequently has to be removed from the chamber with the finger before loading. The spiral spring is liable to get set, and the needle to get bent or broken. The ignition of the charge at the front is a device well understood here, but considered of doubtful advantage. On the whole, the successes of the Prussians by means of the needle gun may be attributed rather to its qualities as a breech-loader, and the admirable drill of the men in its use, than to its peculiarities as a needle gun.

BECKER'S METALLIC ROOFING.

It is well known that considerable difficulty is experienced in keeping sheet-metal roofs tight, on account of the expansion and contraction of the sheets by the changes of temperature. If a roof is covered in the spring, the heats of summer will expand the metal, causing it to wrinkle and loosen.

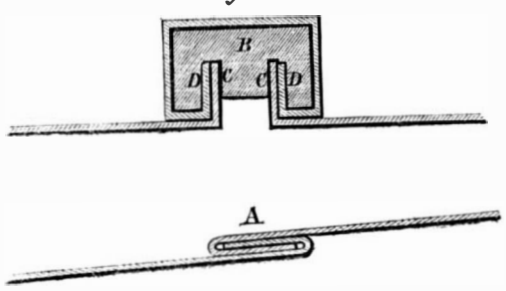
Fig. 1.



But the cold of winter does not, on the other hand, restore the former smoothness. Continual, or, at least, frequent repairs are therefore necessary to preserve such roofs from leaking. To make a tight roof, which would preserve its impermeability under all changes of temperature, is the object of the improvement illustrated in the accompanying engravings.

The sheets, of zinc or tin, are prepared in the shop ready for laying. At each end the edges of the sheets are turned over, one edge in one direction and the other in another, as at A, Fig. 2, making, when slipped together, hook or lap joints. It will be seen that this will give a perfect joint without soldering, when laid on the slope of a roof. The side edges of the sheets are turned vertically upward. The connected sheets being laid along the slope from ridge to eaves, side by side, a strip of wood, B, having on its under side two parallel rabbets or channels, is placed over the upturned edges of the sheets, as at C, which enter the rabbets and thus unite the parallel rows. These strips of wood are themselves previously covered with the metal, which embraces the top and sides, and is secured to the under side of the strip by means of upturned edges, D, similar to those on the sheets and entering the same grooves or rabbets. The wooden strips are connected to the rafters by means of brass wire, and the strips of zinc which cover them, with the sheets, are fastened to the wooden strips by pins passing through the strips horizontally. The ridge is finished by means of a strip, E, covered with the metal and securing the ends of the upper tier of sheets. At the eaves, curved pieces of cast iron, or other metal, are secured to the strips, and hook securely under the eaves projection. The recesses for the side edges of the sheets and the lap joints of the ends of the sheets permit considerable expansion and

Fig. 2.



contraction, sufficient to prevent the curving and wrinkling of the zinc, and as each sheet is independent of the other, a smooth and impermeable roof is at all times assured.

An application for a patent is now pending, and for further information address Ed. Becker, 347 Central avenue, Cincinnati, Ohio.

THE idea of heating railway cars in motion by the rapid movement of air in a vessel has again been tested and brought into notice. The heating of air by rapid motion is no new idea, and where the power for producing the motion costs nothing, it may be rendered effective and practicable; but its production must be at the expense of power which can be utilized to much better effect ex pended on other objects.

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NEW YORK, SATURDAY, SEPT. 1, 1866.

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MECHANICAL NONSENSE.

The avidity with which the "popular press" seizes upon every mechanical statement, and the readiness with which it gives it a place in its columns, without ever investigating it by the light of mechanical knowledge, or even common sense, receive, frequent illustration. It seems to make no difference whether the truth or falsity of a statement, or the value of a professed improvement, can be verified by observation, inquiry, or an effort of memory, or whether the circumstances are beyond the reach of the journalist; in either case the humbug is started on its rounds, and transferred to the columns of every paper in the country. We copy one such bit of mechanical nonsense to illustrate these statements. We have before us now no less than four copies of this paragraph, which we had the curiosity to clip as they met our eye:—

An ingenious application of the process of molding blocks of concrete for building purposes was patented recently in England. The inventor proposes to erect houses by literally casting them of concrete in the place they are intended to occupy. An ordinary concrete foundation is first laid, and upon the foundation horizontal frames, constructed of boards lined with zinc or other metal, are set up on edge so as to form a kind of trough for receiving the concrete. By the insertion of suitable cores, holes for the insertion of the joists, or for other purposes, may be molded in the concrete as the work proceeds. The proprietor of the patent is now in Paris, superintending the erection of some houses on this principle, and we believe it is the intention of the French Emperor to build some laborers' cottages of this kind at one of the imperial farms. This invention will be illustrated at the Paris exhibition.

This "ingenious application, recently patented in England," is the identical method which has been used in this country ever since building by concrete came in vogue. We have heard of the manufacture of blocks of artificial stone for building purposes, but all the structures of concrete we ever knew were built by filling plank troughs, which, for the time, were external walls, with the mixture, and moving them up as the work progressed. In this way houses are built by "literally casting them of concrete in the place they are intended to occupy."

This giving notoriety to worn-out mechanical ideas, without a particle of investigation, or the exercise of discretion, we regard as a serious evil. It belittles the noble work of the mechanic, and brings the labors of the scientific man into contempt. Neither of the classes to which these men belong spend their time or exercise their talents on nonsense; at least they intend to make progress when they apply themselves to the labors of their respective departments, and although an invention may be re-invented, or a discovery be re-discovered, the exertions of our mechanics are not directed to the rehash of old and well-known devices, or the investigations of scientists to the elucidation of physical impossibilities.

The department of the mechanical arts is a department of progress. It is not a dull, unvarying round of endeavor, ending where it began, like the serpent symbol of the Aztecs. If it proceeds in a circle, yet is the completed round a spiral—the termination of an inquiry resting on a higher plane than its beginning and affording the basis for another. But, judging from the record of discoveries and improvements in the arts furnished by our popular journals, the mechanic and the experimentalist in physical science must be little more than dolts or triflers. We protest against this abuse of the high mission of our useful men and this belittling of their work.

To form a tolerably correct estimate of the value of a professed improvement in the mechanic arts, does not necessitate an intimate knowledge of natural science, or a practical acquaintance with mechanics. The laws which govern the science of mechanics are easily learned and understood. Almost any elementary work on natural philosophy will afford the necessary information to enable the paragraphist to form a correct judgment on these matters, and this carelessness, exhibited in giving currency to old, obsolete, or impracticable devices, is really inexcusable, discreditable to the journalist and unjust to the mechanic.

THE INFLAMMABILITY OF PETROLEUM.

There can be no doubt that petroleum, as obtained from the earth in this country, is one of the most inflammable of substances. The numerous fires in the "oil region" of Pennsylvania, where its procurement from the bowels of the earth makes the region a text or guide to a proper estimate of the combustible qualities of this mysterious product, establish the fact that greater care and consideration should be exercised in its handling, transportation, and storage, than is usually bestowed. The destructive fire in Jersey City on the 19th, is a recentlesson. The fire was caused by the ignition and explosion of the gases from a cargo of petroleum, fired by the lighting of a match. It resulted in the destruction of about two million dollars worth of property, and the loss of a number of lives.

The concentrated and powerful heat generated by the combustion of petroleum is surprising. Some of the cars on the track at the Jersey City fire were only partially consumed, but the wheels and iron work of a car truck, on one side of the car, were melted into an indistinguishable mass, while the wheels on the other side retained their form. The rails, also, where the burning oil flowed, were crooked, twisted, and lifted from their places by the intense heat. In June, 1865, traveling over the New York Central Railroad, the train was delayed by the burning of a car load of oil in barrels. On viewing the scene we were struck with the appearance of the track wherever the oil had run along the road. The rails for several rods on either side of the car were twisted and contorted in every shape, and so nearly fused as to lose their definite form, while the flaming car could not be approached for the heat.

The constituents of petroleum are all highly combustible. Few combinations offer such uniform facilities for producing a high degree of heat. It is well known that a paraffine candle or a kerosene lamp gives more powerful results with the common blowpipe than a tallow candle, whale, or vegetable oil, alcohol, or gas. When ignited the flames of petroleum cannot easily be quenched. Water has no effect, and the only way to conquer the conflagration is to smother it with earth by excluding the atmosphere, or to allow it to burn itself out.

But there are other qualities which make crude petroleum still more dangerous. The naphtha which it contains evaporates into a highly inflammable and explosive gas, unless secured in air-tight receptacles. Mixing with the external air, this vapor is almost, if not quite, as dangerous as gunpowder. In consequence of this quality, carelessness in managing petroleum has caused some of the most serious and destructive fires.

There are two remedies for this evil. One is to store and transport the crude oil in metallic vessels hermetically sealed, which is costly and in a measure impracticable. The other is to deprive it at the wells of its explosive constituents. This, we learn, will probably be attempted. The explosive principle, naphtha, is very volatile and can be removed by a low distillation, and condensed, to be managed separate from the body of the oil. A coil of pipe placed in a suitable vessel and conveying the waste steam from the engine, could be used to sufficiently heat the oil to volatilize the naphtha, when the oil would give out no vapor, and could be safely transported or stored in barrels, if they were not perfectly air-tight.

The subject is one of great importance and should receive immediate attention. It is to be hoped that measures will be taken at once to render the management of this substance as safe as that of any other article of commercial and domestic value.

BREATHING---OUT OF DOORS AND IN THE HOUSE.

When a man draws a breath of air into his lungs, the numerous little cavities of the lungs are filled with the air, which is a mixture of oxygen and nitrogen. A portion of the oxygen passes, by the mysterious action of the endosmosis, through the membrane of the lungs, into the blood, which has been distributed on the opposite side of the membrane to receive it. The blood, having absorbed the oxygen, carries it, through the arteries, all over the system into the minute capillary blood vessels, and here it is brought into immediate contact with the food, which, after its digestion, had been poured into the blood. A portion of the carbon of the food combines with the absorbed oxygen, forming carbonic acid, and generating precisely the same amount of heat that the same quantity of carbon would generate if burned in the state of coal in a furnace. It is this heat which keeps up the temperature of the system, and it is the fundamental condition for all those vital actions which constitute life. Life depends upon the perpetual filling of the lungs with oxygen; hence if the windpipe is closed by a rope around the neck, or if the mouth and nostrils are immersed in water, death quickly ensues.

The air that is breathed out of the lungs is mostly nitrogen and carbonic acid, with but little of that oxygen which is the life-giving element. If a person is sitting in a room where the air is confined and still, when a volume of air comes from his lungs it fills the space about his mouth and nostrils, and the next breath that he draws in is mostly this air which has just previously passed through his lungs. As he continues to breathe the same air over and over, it becomes more and more deprived of its oxygen, and more and more surcharged with carbonic acid; consequently his vital functions become less and less vigorous.

On the other hand, if a man is walking in the street while he is breathing, when he throws out a quantity of air from his lungs, his head is carried along away from it before he draws in another breath, and he thus gets a fresh supply of air with its full richness of oxygen at every breath. Hence the vigor imparted to the system by exercise in the open air, and hence the importance of perfect ventilation to those confined in houses.

Besides combining with carbon in the blood, oxygen also combines with iron, changing it from the brown protoxide to the red peroxide—the rouge of the silversmiths. It may be that the more perfect oxidizing of the iron in the blood is one reason for the rosy cheeks of those who live out of doors.

THE "DUNDERBERG."—We publish on another page an interesting history of this formidable ironclad steam ram. She is now ready for her trial trip, and it is expected that she will be able to make 12 knots per hour. The trial of the engines at the dock has proved quite satisfactory.

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ISSUED FROM THE U. S. PATENT OFFICE

FOR THE WEEK ENDING AUG. 21, 1866.

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☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & Co., Publishers of the SCIENTIFIC AMERICAN, New York.

57,271.—COATING METALS WITH METAL.—Isaac Adams, Jr., Boston, Mass.

I claim rendering gas tips and other similar articles anti-corrosive to heat or moisture by surfacing them with nickel, substantially as set forth.

57,272.—BEEHIVE.—Levi W. Abbee and Simon W. Abbee, South Charlestown, N. H.

We claim the external case or box, A, provided with doors, B, at its sides and ends, in combination with a box, D, provided with comb frames, F, and with doors, E, at its sides, and arranged so as to slide within A, substantially in the manner and for the purpose set forth.

We also claim the hanging of the comb frames, F, on hinges, g, in combination with the pins or stops, h, and screws, i, in the side doors, E, of the box, D, substantially as and for the purpose specified.

We also claim the exit passage, k, in the top plate of the box, D, in combination with the bar, H, and pivoted slats, I, provided with holes, l, and the holes, m, in the inner sides of the boxes, G, substantially as and for the purpose specified.

57,273.—ERASER AND BURNISHER.—S. R. Andres, Troy, N. Y.

I claim the combination of a piece of rubber or other erasive material, B, with a brush, C, both set in a suitable frame, A, and arranged in a manner to accomplish the purpose of my invention, substantially as herein specified.

57,274.—LETTER FILE.—Frederick Ashley (assignor to James Edgar and J. E. Cavan), New York City.

I claim securing the upper portion, G, of the hook to a plate, H, arranged in a suitable groove or guide way of the frame, A, or its equivalent, in combination with a spiral or other suitable spring, arranged and operating together, substantially as and for the purpose described.

57,275.—MANUFACTURE OF TOBACCO BAGS.—Guillaume Aymard, New York City.

I claim the mode herein specified of preparing bladders for tobacco bags, etc., by which they are rendered soft and pliable, as set forth.

57,276.—VAPOR BURNER.—W. W. Batchelder, New York City.

First, I claim regulating and steadying the flame of a coal-oil or other similar lamp in the manner and by the means herein specified, that is to say, by interposing between the vaporizing chamber and wick tube or holder of a lamp burner, constructed as above described, a movable and adjustable diaphragm, as and for the purposes hereinbefore shown and set forth.

Second, I claim the movable and adjustable diaphragm, as herein described, the same consisting of a perforated stationary plate, in combination with movable plates of segmental or other suitable shape, constructed and arranged for operation substantially as and for the purposes herein set forth.

Third, In combination with the vapor chamber and surrounding dome and the wick tube of a coal-oil or other burner as described, I claim the movable and adjustable diaphragm, constructed as herein specified, the whole being arranged for operation, substantially as set forth.

57,277.—CIDER AND WINE PRESS.—Charles Beach, Penn Yan, N. Y.

I claim the platen, B, with the receptacle, C, when made and used as specified and for the purpose set forth.

57,278.—SKELETON TUMBLER.—William W. Beach, M.D., New York City.

I claim the construction of the skeleton tumbler as the basis of a series of apparatus, described and represented in the several figures of the drawings.

57,279.—DEVICE FOR BURYING WEEDS AND STUBBLE WHILE PLOWING.—Joseph W. Beer and John B. Wampler, Shelbyville, Ill.

We claim the herein described devices which we denominate "a weed barber," the same being attached to a plow beam, in the manner and for the purpose herein set forth.

57,280.—MACHINE FOR PRESSING TOBACCO.—John Blackie, New York City.

First, I claim the apron, B, having a series of channels of varying or uniform width, for receiving and conveying the tobacco to the pressing rollers, substantially as set forth.

Second, In combination with the apron, B, constructed as described, I claim the belts, m, when said parts are arranged to operate as and for the purpose set forth.

Third, The combination of the grooved cylinder, C, adjustable roller, e', and pressing roller, D, substantially as shown and described.

Fourth, I claim a cutting apparatus, constructed and operating substantially as set forth.

Fifth, I claim the frame, H, provided with the cells, o and a, sliding bottom, I, arranged and operating substantially as and for the purpose set forth.

57,281.—COOLER.—George D. Blocher, Indianapolis, Ind.

I claim the central ice chamber, D, and covers, E and F, arranged as shown, and in combination therewith the milk chamber, B, and butter vessel, C, substantially as set forth.

57,282.—WOODEN SCREW.—Thomas Bowers, Zanesville, Ohio.

As an improved article of manufacture, I claim the wooden screw, which works in a nut or matrix, constructed with a spiral thread which has a bearing surface, d, perpendicular to the axis of the screw, a cylindrical surface, c, which is parellel to said axis, and inclined surface, b, which forms an obtuse angle with the cylindrical surfaces, c and e, all as described and represented, and for the purpose set forth.

57,283.—CORN HUSKER.—Thomas J. Brown, Clio, Ohio.

I claim a corn husker, constructed with a flexible band, A, to which is fastened the plate, A, covering the entire palm of the hand, and having attached thereto the curved point, C, projecting toward the fingers, substantially as set forth.

57,284.—APPARATUS FOR SUPPRESSING EFFLUVIA FROM DRAINS.—Walter Bryent, Boston, Mass.

I claim the combination of the top or strainer, g g, formed with the flanges or lips, f f and h h, with the groove or gutter, c c, and basin, e e, as described and for the purpose specified.

57,285.—APPARATUS FOR TREATING PETROLEUM.—D. H. Burket, Halfmoon, and J. C. Gray, Putneyville, Pa.

First, We claim distributing pipes, N N, and wings, W W, when constructed and operating with pipe, M, and tank, A, substantially in the manner and for the purposes set forth.

Second, The packing box, E, when constructed and operating with F, and connection pipe, D, substantially in the manner and for the purposes set forth.

57,286.—PLOW COLTER.—Samuel Casebeer, Roseburg, Oregon.

I claim the application to plows of the aforesaid cutter, in the way and manner herein described.

57,287.—FEEDING DEVICE FOR SEWING MACHINE.—William Chicken, Boston, Mass.

I claim the said friction feed apparatus as composed of the levers, C E, the wedge, D, and the two wheels, A B, arranged and applied together, substantially in the manner and so as to operate as specified.

57,288.—VAPOR STOVE.—Samuel Child, Jr., Baltimore, Md.

I claim the combination with the retort pipe and heating chamber of a vapor stove of the tubular valve rod operated upon the axis of the said retort pipe, as described, under such an arrangement that the said rod, while regulating the supply of fluid to the heating chamber, shall also constitute the medium through which the fluid is conducted into the said chamber, substantially as herein shown and set forth.

57,289.—MANUFACTURE OF BOOTS.—John J. Christian, Yonkers, N. Y.

I claim the arrangement of the ornamental cap, A, vamp or upper leather, B, in combination with the perforations, b b b, strip, C C, forming an air passage, substantially as and for the purpose herein set forth.

57,290.—ROOF.—Charles S. Clark, Huntsburgh, Ohio.

I claim an improved roof having as many ridges meeting in a peak at the center, and as many gables as there are sides to the building, the lowest points of the rhomboidal parts or surfaces of the roof being at the corners of the building, substantially as described and for the purposes set forth.

57,291.—WASHING MACHINE.—Charles A. Codding, Battle Creek, Mich.

I claim the horizontal spring arms, h i, in combination with the roller, D, substantially as and for the purpose described.

57,292.—MODE OF HANGING PITMAN, ETC.—E. H. Craig, Brooklyn, N. Y.

First, I claim forming the bearings or journals of connecting or other rods in machinery of a V or other equivalent shape thereto, substantially as herein described for the purposes specified.

Second, The adjustable slides or bars, l, constituting a portion of the bearings or journals of connecting and other rods in machinery, when arranged upon the said rods so as to be susceptible of adjustment, substantially as and for the purposes described.

57,293.—APPARATUS FOR DESULPHURIZING ORES.—Francis W. Crosby and Woodhull Helm, New York City.

We claim the combination of a series of sliding tables or shelves with the interior of an inclined hot-air or gas conducting flue, substantially in the manner and for the purpose set forth.

We claim also, in our improved apparatus, so combining the lower extremity of the inclined flue with the eduction flue of the furnace as that the ore or other material falling from the inclined plane shall drop in a thin sheet over the mouth of the said eduction aperture, substantially in the manner and for the purposes herein set forth.

57,294.—BENDING CARRIAGE THILLS.—Jesse W. Dann, Columbus, Ohio.

First, I claim, in the process of bending shafts for vehicles, the wedge, g, for the purpose specified.

Second, I claim the wedge, h, for the purpose specified.

Third, I claim the back or outer projection on the step, c, for the purpose specified.

Fourth, I claim the ears, b b, and the beveled wedge, e, together with the block, d, for the purpose specified.

Fifth, I claim broadly the means as herein set forth for tightening and holding the strap upon the shaft during the operation of bending, substantially as specified.

57,295.—RAILROAD SWITCH LANTERN.—Edward E. and Albert B. Dickerson, Oshkosh, Wis.

First, We claim providing a lantern, A, having glasses of different colors, with a series of tubes or blinders, E, arranged substantially as and for the purposes herein specified.

Second, We claim imparting the requisite rotatory movement to said lantern by the reciprocating motion of the switch bar, c, substantially as shown and described.

57,296.—GLASS PRESS.—Hiram Dillaway, Sandwich, Mass.

First, I claim the plunger or follower, L, hung on a sliding head or frame moving upon guides, E E, and connected through rods, U, with crank arms of a shaft, W, arranged in slotted bearings, to the opposite ends of which crank arms rods, z, are connected at one end, and at their other hung upon fixed pivots, X, substantially as and for the purpose specified.

Second, The mold, B4, arranged and connected with the shaft for operating the plunger, in such a manner as to be moved under and away from the line of movement of the plunger, substantially as and for the purpose described.

Third, The head plates, and R, rods, O and Q, cross bars, P, springs, R2, when all arranged and connected together and to the plunger, so as to operate substantially as and for the purpose set forth.

57,297.—HAND JACK FOR CONGRESS GAITER.—Henry F. Dougherty, Monmouth, Ill.

First, I claim the bar, A, and catch, B, operating substantially as described and for the purpose set forth.

Second, The combination of the bar, A, and catch, B, with the "shoeing horn," M, substantially as described, and for the purpose set forth.

57,298.—HYDRAULIC ENGINE.—Jacob Dreisorner, New York City. Antedated Aug. 2, 1866.

First, I claim the arrangement of a revolving piston having a concentric groove in its circumference, divided by a partition and placed in a suitable cylinder, provided with a slide valve, and a stationary wedge (between the two parts) made to work perfectly tight in said concentric groove, in combination with a second revolving piston, placed in a suitable cylinder, and provided with a spiral groove in its circumference, in which a piston block, held by said cylinder, is made to move perfectly tight, said spiral groove communicating at each end through passages, closed by self acting valves with the ends or heads of the cylinder as well as with a central passage provided in shaft, and communicating with a pressure box, connected with the slide valve case of the first mentioned cylinder, the whole being combined together and operating in such a manner that the piston with the spiral groove shall force water or other fluid into said pressure box, so as to produce a pressure therein, which said pressure shall act upon either the one or the other side of the partition in the concentric groove in the first mentioned piston, in such a manner as to rotate said piston backward and forward around its axis, and which said motion shall be communicated to the second piston operating the same in the manner specified.

Second, I claim the construction of the revolving piston, B, arranged with a concentric groove, F, in its circumference, having a partition, J, and placed in a cylindrical case, C, provided with a suitable slide valve and case, in combination with a stationary block, G, fitting tight in said groove, F, and held fast in the cylinderical case, C, and situated between the parts, a and b, the whole being arranged and combined in the manner and for the purpose described.

Third, I claim the construction of the revolving piston, H, provided with a spiral groove, L, in its circumference, working in a cylinder, E, and arranged with suitable passages closed by self-acting valves, N N' and P P', forming communications between the ends of said spiral groove, L, and the ends or heads, K K', if the cylinder and the reservoir, D, connected with said cylinder as well as with the passage, M, made in the shaft, A, and through the same and its connecting chamber, R, and valve, T, with a strong box or chamber, Z, and operating in combination with the piston block, Q, made to fit tight in said spiral groove, L, and held fast in a groove, h, in the cylinder, E, in the manner and for the purpose substantially as set forth and described.

Fourth, I claim the arrangement of the channel way, M, in the shaft, A, communicating with the ends of the spiral groove, L, in the piston, H, and through the chamber, R, and valve, T, with the pressure box, Z, when constructed in the manner as specified.

Fifth, I claim the arrangement and construction of the piston block, Q, provided with suitable packing and fitting tight in the spiral groove, L, and held fast by means of slides or friction rollers working in the groove, h, made in the cylinder, E, capable of a motion sideways or longitudinal with the cylinder and operating in combination with the spiral groove, L, in the manner and for the purpose substantially as described.

Sixth, I claim the construction of the packing rings or bands, p p', on the sides of the concentric and spiral grooves acting diagonally toward the grooves and to the surface of the piston and operated by suitable springs, and arranged in the manner and for the purpose set forth.

Seventh, I claim the manner of packing the surfaces at the ends of the spiral groove, L, as well as the surface in the partition, J, in the concentric groove, F, by means of plates, x x and n, operated by suitable springs situated below said plates as well as by springs, v, acting against the ends of the packing plates, x x, in the manner and for the purpose described.

Eighth, I claim the arrangement of a piston, B, provided with a concentric groove, F, and a piston, H, provided with a spiral groove, L, situated upon the same shaft, or its equivalent, and working in suitable cylinders, in the manner and for the purpose substantially as set forth and described.

57,299.—FOUNTAIN LAMP.—John P. Driver, Marengo, Iowa.

First, I claim a groove or trench, g, Fig. 6, cast in the outside of a glass fount and leading from the top to the bottom of the fount to be of sufficient depth and width to neatly take in, and imbed and hold in place an external supply pipe.

Second, A fluid, or oil duct, n o, Fig. 4, cast in the side of a glass fount to be and operate substantially as the upper portion of a supply pipe, to be so enlarged and arranged at the lower end that a metallic pipe may be securely fastened in it.

Third, A fluid or oil duct, n o, Fig. 4, made by inlaying or imbedding a glass tube in the side of a glass fount, the upper end to open and enter the fount in or about the neck, the lower end terminating in the stem, y y, said duct or inlaid pipe to operate and to be to all intents and proposes as a part of the supply pipe.

Fourth, The upward extension, N O, of the supply pipe, M N O so that it shall discharge the oil or fluids forced through it into the upper side of the fount, F, whether said elongated pipe be within the fount, or carve up around the outside of it, connecting with the inside through or about the collar.

Fifth, The enlarged aperture through the stem or bottom of the fount or as the entrance of the duct, N O.

Sixth, The thimble-shaped mouth, b, the valve, i, in the air pipe, N, Fig. 3, including the said air pipe, N, or its equivalent substantially as specified.

Seventh, The combination in a fountain lamp of a reservoir, R, in the base, either an external or internal supply pipe, M N O, which shall discharge the oil into the top, or upper side of the fount, F, whether it be a separate pipe or a duct fixed in or to the side of the fount, the cork packing, C C, the cement bed, t t the bellows, D, the air pump, B, the blow pipe, P, the air pipe N, the groove, g, and oil duct, o, or their equivalents, substantially as and for the purpose specified.

57,300.—SHUTTLE BINDER FOR LOOMS.—Christopher Duckworth, Mount Carmel, Ct.

I claim the shuttle binder, composed of the parts, B C, when these parts are constructed substantially as described.

Second, The construction of the removable piece, C, with a cupped receptacle for the spring which produces pressure upon the tongue, B, substantially as described.

57,301.—EVAPORATOR.—Augustus S. Eddy, Smithville, N. Y.

I claim the conducting spout, C, cut-off gate, b, lever, e, and strainer, f, operated by the float, D, connecting rods, g and h, balance beam, E, substantially as herein described, in combination with the receiving tub or tank, A, the evaporating pans, B B B, and siphons, K K K, for the purpose herein set forth.

57,302.—CAPSTAN.—Jacob Edson, Boston, Mass.

First, I claim the combination of the pawls, r r and s s, so arranged as to operate in opposite directions with each other, with the ratchet or toothed plate, o o, and q q, as herein above described and for the purpose specified.

Second, In a capstan forming the head in which the running gears are placed in two disks united by sustaining bridges, the two disks being united so as to form substantially one piece, as specified.

Third, In a capstan constructing the ratchet or toothed plate, o o, and gear, n n, in one piece as described.

Fourth, In a capstan casting the base, a a, and shaft or spindle, b b, hollow and in one piece to e, as specified.

57,303.—HYDRAULIC PRESS FOR PEAT, BRICK, ETC.—A. H. Emery, New York City.

First, I claim the combination and use of the rotating disk, A, in combination with the dies, 2 2 2, etc., and presses O' and C, as and for the purposes herein specified and set forth.

Second, The combination and arrangement of the disk, A, dies, 2 2 2, etc., with two or more presses, O and O', and for the purposes herein specified and set forth.

Third, The arrangement of the rotating disk, A, dies 2 2, etc., in combination with the three presses, O O1 and O2, or their equivalents, as and for the purposes herein described and set forth.

Fourth, The combination and use of the presses, O', and 4, or their equivalents, as and for the purposes herein described.

Fifth, The construction and use of the compound press, O', essentially as and for the purposes herein described and set forth.

Sixth, The construction and use of the beam, C', in combination with the cylinder, 4', as and for the purposes herein described and set forth.

Seventh, The construction and use of the plungers, b b', etc., with the concave ends, essentially as and for the purposes herein described and set forth.

Eighth, The combination and arrangement of the plungers, b2, sponges, 8, and oil cups, 9, as and for the purposes herein described and set forth.

Ninth, Oiling the disks, 2 2 2, etc., as and for the purpose herein described and set forth.

Tenth, The combination and arrangement of the pressures, H and O', as and for the purposes herein described and set forth

Eleventh, The combination and arrangement of the hopper, Q, charger, R, and dies, 2 2, etc., as and for the purpose herein specified and set forth.

Twelfth, The combination and arrangement of the disk, A, wheels, u v y z, and their axis, the pawl, 15, rack, W, and press, V, essentially as and for the purposes herein described and set forth.

Thirteenth, The combination of the press, 10, pin, 11, and disk, A, essentially as and for the purposes herein described and set forth.

57,304.—PROCESS FOR PURIFYING SPRUCE GUM.—Hiram B. Esty, Houlton, Me.

I claim the above described mode of purifying resinous gum, the same being by means of a close chamber, and one or more sieves therein, and by heat introduced within such chamber, by means substantially as described.

I also claim the apparatus for effecting the purification of a resinous gum, the same consisting of the close chamber or vessel, one or more sieves placed therein, and a means of introducing heat into such chamber, the whole being substantially as specified.

I specially claim, for the purification of resinous gum, the employment of steam in the close chamber, with one or more sieves or strainers arranged therein for straining the gum when melted and subjected to the action of the steam.

57,305.—MACHINE FOR FORMING AND CUTTING SKIRT SPRINGS.—J. J. Fairbank, New York City.

First, A machine for measuring and cutting off wire into

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various lengths from a continous piece, consisting of a rotating reel with attached cutters and a traversing guide combined, substantially as herein set forth for the purpose specified.

Second, The adjustable pins or screws, i, in combination with the reel, B D, substantially as herein set forth for the purpose specified.

Third, The bar, J, furnished with spurs, u, and fixed upon a handle, s, and used in connection with the reel, B D, substantially as herein set forth for the purpose specified.

57,306.—WATER ELEVATING DEVICE.—Daniel Flagg, Concord, N. H.

I claim the arrangement of the vessel, A, vessel, C, and tube, D, in combination with the suction pipe, B, constructed and operating as herein described.

57,307.—FABRIC TO BE USED AS A SUBSTITUTE FOR JAPANNED LEATHER.—John Fletcher, Newark, N. J.

I claim a fabric produced of muslin, silk, leather, or other suitable material, united with paper by means of the compound herein specified, and coated with leather, japanner's varnish as specified.

57,308.—PAPER-COLLAR MACHINE.—John C. Ford, Cambridge, Mass.

I claim the combination of the convex and concave rolls, c and d, and the guides or guiding surfaces, e f g and h, when arranged to operate substantially as described.

57,309.—HOOP SKIRT.—Lavinia H. Foy, Worcester, Mass.

First, I claim the glazed cloth supports for the bottom hoops in combination with hoops painted or covered with some insoluble coating, as and for the purpose stated.

Second, The combination with the bottom hoops of a hoop skirt of glazed cloth supports or coverings and strips of stiff paper or other suitable material, substantially as and for the purpose set forth.

Third, The combination with the bottom hoops of a hoop skirt of stiffened supports, substantially as and for the purpose set forth.

57,310.—ESCAPEMENT IN WATCH.—Smith D. French, Wabash, Ind.

First, I claim so constructing the pallet arms, J J, that they shall extend over and above the escapement wheel, and that the pallets shall be projected downward from their ends across the path of the teeth of the escapement, whereby I am enabled to increase the distance between the pallets and their staff, substantially as and for the purpose above set forth.

Second, The adjustable cross bar, E, in combination with the pallet arms, J, operating in the manner and for the purpose herein specified.

57,311.—APPARATUS FOR DISTILLING OIL.—J. B. Grant, New York City.

First, I claim the employment in apparatus or machinery for distilling and refining petroleum and other oils, of a series of heating pipes set in the form of two cones, the bases of which meet and through which the products of combustion from the furnace pass, all substantially as herein described.

Second, The employment in the same apparatus for condensing the vapors of petroleum and other oils, of a cylinder inclosed in another cylinder with a space between them for the circulation of cool water and suitable pipes for receiving and discharging the vapors and oil in and from the internal cylinder, and the water in and from the external cylinder, all constructed substantially as herein described.

Third, The general arrangement, combination, and method of operation of the apparatus or machinery, substantially as and for the purposes herein described.

57,312.—SPRING FOR CARRIAGES, ETC.—A. B. Greenwalt, Baltimore, Md.

I claim a spring having the general conformation represented in Fig. 2, and formed with the curved part, c', substantially as and for the purpose set forth.

57,313.—DIE FOR BOLT-HEADING MACHINES.—John Gribben, Allegheny, Pa.

I claim the dies for making square headed bolts constructed substantially as herein-before described, that is to say, so that when brought together they will inclose a cavity in which to form the head, of which cavity two opposite sides are removed for a space in the direction of the length of the bolt equal to the thickness of the head, but otherwise inclosing all sides both of the blank and of the upsetting punch.

57,314.—SELF-SEALING BUTTONHOLE PATCHES FOR PAPER COLLARS.—Thomas Griffin, Roxbury, Mass.

First, I claim the prepared, detached self-sealing buttonhole patch, for mending paper collars when they become broken at their buttonholes, as a new article of manufacture and sale, substantially as herein described.

Second, The construction of the prepared self-sealing buttonhole mender of paper and cotton, substantially in the manner described so that it shall have sufficient stiffness for the purpose intended.

Third, Mending broken out buttonholes of paper collars, by means of a self-sealing patch, substantially as described.

57,315.—CLOCK ESCAPEMENT.—Emile Groux, Rome, N. Y.

I claim the combination of the pendulous pallet arms or levers, with the escapement, substantially as herein shown and described.

57,316.—BLOCK AND TACKLE CHECK.—D. C. Cuttridge and W. F. Rogers, Canton, Ohio.

I claim the lever, E, constructed substantially as specified, and used in connection with the block, A, as and for the purpose set forth.

57,317.—ICE AND COAL BOX.—Robert Hagen, St. Louis, Mo. Antedated Aug. 3, 1866.

I claim the box, A, in combination with the ice tray, D, and the doors, a a' b b' c and d, when constructed and operated as and for the purpose set forth.

57,318.—UMBRELLA.—A. A. Hardy, Pittsburgh, Pa.

First, I claim an umbrella or parasol having supporter, A, constructed and arranged substantially as shown and described.

Second, Making said supporter adjustable, as and for the purpose set forth.

57,319.—MACHINE FOR BORING WAGON HUBS.—Thomas Harper, West Manchester, Pa.

I claim the use of the bearing, A', for the master wheel, B', said bearing and wheel being constructed, arranged, and operating with relation to the various parts as herein described and for the purpose set forth.

57,320.—BROOM HEAD.—Alexander Harroun, Jr., Onondaga, N. Y.

I claim the combination of the two metallic parts joined together by the arms, b b b b, with the guides, the metallic pins, and the shank furnished with screw thread and ferrule, all constructed substantially as and for the purpose set forth.

57,321.—FLOAT VALVE FOR CISTERNS.—Edwin Heald, Washington, D. C.

I claim the construction and combination of the float, A, piston, B, guides, D D, valve, C, and double screw cylinder, H, forming the valve seat, C, all as herein described, and for the purposes set forth.

57,322.—CONSTRUCTION OF WELLS.—Garet G. Heermance, Claverack, N. Y.

First, I claim the manner of constructing the well or hole, as set forth.

Second, The construction of the strainer section with horizontal shoulder collars, d d", and vertical ribs or strips, i i, the said strainer section having the wire gauze or other finely perforated material placed outside of the pipe, and above the sand chamber thereof, substantially as described.

Third, The collars, d d" or d d' d", on the strainer section, substantially as and for the purpose described.

Fourth, Trapping the water by the partition, e, filtering it in its descent by the material, g g, and discharging it through the pipe after it has entered through a strainer section which is near the lower end of said pipe, substantially as described.

Fifth, The collar, e, in combination with an apparatus such as herein described, for the purpose set forth.

57,323.—WRECKING CAR.—George Herrick, Nashville, Tenn.

First, I claim the crabs, F, in combination with the windlass, H, and crank, A, applied with the track, G, and operating in the manner and for the purpose herein represented and described.

Second, The arrangement of the framing, I, mast, J, with its ends, as described, and boom, K, joined thereto, tackle, L, tackle, N, and the hoisting rope, k, in combination with the car, A, constructed and operating in the manner and for the purpose herein specified.

57,324.—ROOFING COMPOSITION.—Benjamin Hinkley, Troy, N. Y.

I claim a roofing composition composed, applied, and coated with whitewash, as herein described.

57,325.—MITERING MACHINE.—Frank A. Howard Belfast, Me.

I claim the reciprocating head, C, with its adjustable knives or cutters, g g', in combination with adjustable rests, D D', constructed and operating substantially as and for the purpose described.

57,326.—STOP MOTION FOR BRAIDING MACHINES.—H. B. Howe and W. J. Mackrell, New York City.

First, We claim the tappet lever, E, and hinged latch, g, in combination with the stop lever, F, of a braiding machine, constructed and operating substantially as and for the purpose set forth.

Second, The adjustable finger, e, in combination with the tappet lever, E, and with the threads of a braiding machine, constructed and operating substantially as and for the purpose described.

57,327.—EVAPORATOR.—William H. Isaacs, Terre Haute, Ind.

The arrangement with the fan of the holders, F F, substantially as and for the purpose specified.

The handles, D D, in combination with the skimmer and the notches, or their equivalent, in the pan, substantially as and for the purpose described.

57,328—HEAD DRESS FOR LADIES.—Hannah S. C. Iverson, New York City.

I claim the foundation piece, b, carrying the length or braid of hair, and fitted in the manner specified, so as to be introduced within the natural hair, for the purposes and as set forth.

57,329.—WATER GATE.—Nathaniel Jenkins, Boston, Mass. Antedated Aug. 15, 1866.

For a water gate, the arrangement of a valve, consisting of a non-elastic core, O, preferably hollow, clothed with elastic material, p, and its combination with the ledges, d, of the valve seat, operating substantially as described.

57,330.—COP WINDING MACHINE.—Barton H. Jenks, Bridesburg, Pa.

First, The hollow spindle, C, in combination with the bobbin spindle, C', when the same are constructed, arranged, and operate in the manner and for the purpose herein described.

Second, The combination and arrangement of the hollow spindle, C, bobbin spindle, C', and blank holders, B B', substantially in the manner and for the purpose herein described.

57,331.—HAY PRESS.—Isaac H. Johnson, Long Reach, West Va.

First, I claim a double-acting press, consisting of a follower working in a box in either direction on three horizontal or perpendicular fixed screws, the force and velocity of which machine are capable of being varied within certain limits at pleasure, in the manner and for the purposes described.

Second, Providing a press constructed as described with a grating, g, arranged as and for the purpose set forth.

57,332.—AUTOMATIC CALCULATOR FOR SCALES.—John Johnson, Saco, Me.

I claim the fixed plate, F, the revolving disk, G, and the index, I, in combination with the spiral spring balance or other weighing apparatus, for the purpose of indicating the total value of any article that is weighed upon the scale.

57,333.—LINING FOR OIL BARRELS.—Robert V. Jones, Canton, Ohio.

I claim the within mentioned ingredients when mixed together and used as and for the purposes herein specified.

57,334.—MITER BOX.—George Keating, Thomaston, Me.

I claim an adjustable miter box for sawing beveled work or miters for rhomboidal figures of any desired angles, constructed and arranged substantially as herein described.

57,335.—SKATE.—Jacob Kinzer, Pittsburgh, Pa.

I claim as an article of manufacture a cast-iron skate, substantially as shown and described.

57,336.—HAND SPINNING MACHINE.—H. Koeller, Camp Point, Ill.

I claim the swivel standard, B, forming the bearings for the shafts, d e, and the bifurcated arm, C, forming the bearings for the spindle, E, in combination with the screw clamp, A, constructed and operating substantially as and for the purpose described.

Also, the driving wheel, D, and india-rubber disk, f, standard, B, arm, C, spindle, E, and screw clamp, A, all constructed and operating substantially as and for the purpose set forth.

57,337.—HORSE HAY FORK.—Andrew J. Laird, Middleton, Pa.

First, I claim, in combination with a sliding rod, C I, the lever, F, with its upper horizontal arm adapted to project through the ring, H, substantially as described and for the purpose set forth.

Second, I claim the combination of the bars, A A, sliding rod, C, tines, D D, link or connecting rod, E, and lever, F, all arranged and operating substantially as described.

57,338.—BED-BUG TRAP.—Ezra B. Lake, Bridgeport, N. J.

I claim an improved bed bug trap, the same consisting of the box with circular flange, A, partitions, E F, forming compartments, B C D, grooved block, G, cap, H, and trough, J, constructed and arranged substantially as herein described and for the purpose set forth.

57,339.—ANCHOR.—F. J. Latham, New York City.

I claim, in combination with the shank constructed substantially as shown, the use or employment of the stock, flukes, and crown piece, as and for the purposes fully indicated.

57,340.—FRACTURE BED.—M. M. Latta, Goshen, Ind.

I claim the bed having a central portion, C, consisting of the slide moving in guides, F, on rollers, G, and the sliding chamber holder, H, provided with the sections, B D, and supports, E, operating substantially in the manner and for the purpose represented and described.

57,341.—PLOW.—Z. W. Lee, Blakely, Ga.

I claim the combination of the shank, E, bracket, F, pivoted arm, J, shackle, K, and wedge, L, all arranged and operating substantially as and for the purposes herein explained.

57,342.—BUTTONHOLE CUTTER.—William Lieber, New York City.

I claim the slotted knife, d, operating in combination with the grooved bracket, a, provided with stud, f, arranged with the adjustable anvil, e, on bracket, b, substantially as represented and described.

57,343.—JOURNAL BOX.—Edward F. Light, Worcester, Mass.

Making the lower half, A, of a journal box with a groove or channel, b, and chamber or recess, C, in combination with the upper edges, with inclined planes, a, and the end with flanges, c and e, substantially as set forth.

57,344.—CHILDREN'S SLED.—N. P. Lindergreen, Boston, Mass.

I claim the brake levers, c, hung to and upon the sides of a children's sled, substantially as and for the purpose described.

I also claim connecting the rope of the sled to the brake levers, c, through short pieces, I, substantially as described and for the purpose specified.

57,345.—CORN HARVESTER.—Robert B. Linthicum, Lexington, Ill.

First, I claim the combination of the curved arm, J, cross bar, L, wheels, m, shock receiver, H, and curved track, K, arranged and operating substantially as shown and described.

Second, I claim, in connection with a shock receiver, H, the employment of lever, Q, with the hooks, l and q, and the compressing cord, n, as and for the purposes specified.

Third, I claim the arrangement of the pivoted wheels, W, and vibrating bar, T, with the frame, B, of a harvesting machine, as and for the purposes set forth.

57,346.—HORSESHOE.—William Litzenberg, Macomb, Ill.

I claim combining with the main part, A, of the shoe, the removable and reversible corks, B and C, constructed and applied substantially as herein described and for the purpose set forth.

57,347.—FUNNEL.—C. L. Lochman, Carlisle, Pa.

First, I claim a funnel provided at the spout with a spigot or valve, worked by the upright rod, H, for opening and closing the same, substantially as set forth.

Second, A funnel having a valve at its nozzle and a screw washer or fastener at its neck, substantially as described.

Third, In combination with a funnel, having a metallic or an elastic washer, E E, and a valve or a stopple at the spout, an air tube, B B, and shield, D, for the purpose specified.

57,348.—WASHING MACHINE.—James R. Madison, Oneida, Ill.

I claim the rubbers, 1 2 3, operated by the crank, C, and the pitman, D, the cogged rock, F, in combination with the wheel, S, and fly-wheel, A, when the same are constructed in the aforesaid combination and for the purposes set forth.

57,349.—MODE OF TEMPERING STEEL.—Cephus Manning, Chillicothe, Ohio. Antedated Aug. 8, 1866.

I claim the use of raw linseed oil, in the manner and for the purpose specified.

57,350.—STOP MOTION OF LOOMS.—Adams Marchington, Upland, Pa.

First, I claim the vibrating lever, F, in combination with the wiper, K, on the shaft, B, all arranged and operating substantially as described.

Second, I also claim placing the vibrating lever, F, on a sliding bar, J, substantially as described.

Third, I also claim, in combination with the wiper, K, the lever, F, the sliding bar, J, and the levers, M and N, substantially as described.

57,351.—RAILROAD-CAR SEAT.—Mark M. and Frank Martin, Aurora, Ind.

First, We claim a car seat composed of two distinct parts, to wit: the body, A, and supporting frame, D, when hinged or otherwise connected together, substantially as herein described and for the purpose set forth.

Second, In combination with the body, A, and supporting frame, D, we claim the adjustable supports G G', and locking device, J J', all arranged as and for the purpose explained.

Third, In combination with the elements of the first claim, we also claim the sockets, f f, anchoring pins, K K', hook, L, and staple, N, to enable the reversal of the seat and securing it in either position, in the manner described.

57,352.—FRICTION PULLEY.—L. G. Mason, Worcester, Mass.

First, I claim the combination of a hinged friction lever, E, with the slide, d, frame, C, and shipper piece, G, with a cam fork, f, substantially as and for the purpose set forth.

Second, I claim making flange, F, with slots to receive the slides, d, in combination with providing arms, D, with slots, b, for the purposes stated.

57,353.—TURN TABLE FOR RAILROADS.—G. B. Massey, Mobile, Ala.

A railroad turn table provided with endless metallic belts, G, fitted on drums, E F, the shafts of one or more of which have pinions for their lower ends, in combination with the fixed wheel, B, at the bottom of the pit in which the turn table is fitted, and into which wheel the pinions gear, substantially as and for the purpose set forth.

57,354.—IRON FOR CURLING HAIR.—Hiram S. Maxim, Boston, Mass.

I claim, in combination with a hair-curling iron or rod, and so as to form a part thereof, a flame burner and chamber, and a fuel or gas chamber for heating the iron or rod, substantially as described.

I also claim, in combination with the flame chamber and curling rod, the steam-generating chamber, arranged to operate substantially as set forth.

57,355.—ENGINE FOR REDUCING RAGS, ETC., TO FIBER.—James McCracken, Bloomfield, N. J. Antedated Aug. 8, 1866.

First, The combination, in an engine of similar character to what is known as a rag engine for the reduction of fibrous stock, of a circular or annular stationary trough, one or more conical rollers, and a conical washer, substantially as and for the purpose herein specified.

Second, The combination of a circular or annular stationary trough, one or more conical rollers, and one or more series of stationary straight knives, b b, arranged in planes parallel with the shaft or shafts of the roller or rollers, substantially as and for the purpose herein specified.

57,356.—STOPPER FOR BOTTLES.—Frederick Miller, Newark, N. J.

I claim a bottle stopper composed of a metal cap or socket, D, containing a packing, E, of india-rubber, or other suitable elastic and water-proof material, and connected by metal rods or straps, c c, to a metal band, C, around the neck of the bottle, the rods or straps being attached to the band by a joint connection to admit of the packing being pressed or shoved over and off from the mouth or nozzle of the bottle, substantially as shown and described.

57,357.—MEDICINE.—George Montgomery, Canton, Ill.

I claim a pulmonary balsam, as herein described, when compounded of the ingredients specified, substantially as described.

57,358.—GRATE BAR.—Richard Montgomery, New York City.

First, I claim the fimbriated corrugated plates or sheets, C C, projecting from the sides of the bar, A, constructed and arranged substantially as described.

Second, The hollow tubes, d d, in combination with the corrugated fimbriated plates, C C, substantially in the manner and for the purpose set forth.

Third, I claim the notches, e e, in combination with the plates or sheets, C C, substantially as described.

57,359.—CONSTRUCTION OF SHIPS.—Richard Montgomery, New York City.

First, I claim the combination of the keel, D, ribs, E, and keelson, B, when arranged and secured together, substantially as set forth.

Second, The combination and arrangement of the keel, D, and

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keelson, B, in the manner set forth, for forming the bow and stern post of vessels.

Third, Covering the frame of a vessel thus constructed, first with a sheathing of iron sheets or plates, over which is placed the planking, the three being united together by bolting or otherwise.

Fourth, Connecting the ends of two beams when they are required to be united in any other than a right line with each other to complete the required structure, substantially as described and set forth in Figs. 3 and 4.

57,360.—CORN HARVESTER.—Charles G. Moreman, Brandenburg, Ky.

First, I claim the provision in a corn harvester of a cradle consisting of the rock shafts, P P', and tines, p p', arranged in relation to each other and to the cutters, F and G, and main frame, A, and operating substantially as described and set forth.

Second, In combination with the cradle, P P' p p', I claim the retaining and liberating mechanism, R R' S S', and T t, as and for the purpose explained.

57,361.—DEVICE FOR CUTTING CORN FROM THE COB.—F. A. Morley, New York City.

First, I claim the four knives, C C C C, forming an elastic cutting ring, their cutting edges, c r, being overlapped, each knife having its side edge, c, on the outside of lap and the opposite edge, r, on the inside of the lap, and having oblique cutting edges in connection with the bed, G, having a trough or grove, k, and sliding headblock, H, as herein shown and described.

Second, I claim gages or guides, D, in connection with the knives, C, and set screws, e, for regulating the depth of the cut and allowing all sizes of ears to be run through, as herein shown and explained.

57,362.—BLOW PIPE.—O. A. Moses, Charleston, S. C.

First, I claim the slot, B, and slider, a, and the movements imparted to the same, operating in the manner and for the purpose hereinbefore stated.

Second, The forked lever, E, and set screws, G and H, or their mechanical equivalents, and the standard, F, and the movements imparted to the same, in the manner and for the purpose specified.

Third, The clamps, R S, and connecting rods, Q Q', and the application of the screw arrangements, O P a c N M F' d and K L, or their mechanical equivalents, operating substantially in the manner and for the purpose hereinbefore specified.

Fourth, The axle of the lamp, V, the levered screw, X, and curved washer, Y, and the slot in which they play, or their mechanical equivalents, operating in the manner and for the purpose herein described, or any other substantially the same.

57,363.—STRAW CUTTER.—J. H. Mumma, Harrisburg, Pa.

I claim the disks, D D', with their ribs, e e, and recesses, f, adapted for the reception of the adjustable plates, E, the whole being constructed and arranged substantially as described.

57,364.—BEAM OF LETTER SCALES.—Richard Murdock, Baltimore, Md.

I claim the letter scales provided with a graduated beam having the figures upon its flat upper side, substantially as described.

57,365.—SPRING FOR RAILROAD CARS.—John Murphy, New York City.

First, I claim the yielding fibrous envelope, B, so arranged around a mass of rubber, A, as to support the exterior while the rubber in its interior is free from fiber, all substantially as and for the purposes herein set forth.

Second, I claim a rubber and fibrous spring composed of the interior mass, A, and an exterior layer, C, and ends, D1 D2, of rubber, in combination with a yielding fibrous envelope or support completely imbeded in and covered by the rubber, substantially as and for the purposes herein set forth.

57,366.—FENCE.—William Neely, Sandy, Ohio.

I claim an improved fence formed by the combination of the iron posts, A, constructed as herein described, with the rails, B, substantially as and for the purpose set forth.

57,367.—CANE HANDLE.—Herman Nitzsche, Philadelphia, Pa.

Holding together the parts composing an angular shaped handle for canes, etc., and directing the lengths of the handle forming the angle by means of the bent screw rod, a, the nuts, b1 b2, and the angle piece, b, substantially as herein specified and described.

57,368.—STOVE-PIPE DAMPER.—H. Ogborn and A. F. Chapin, Richmond, Ind.

First, The bar or rod, B, slots, I I, and sliding valve, C, when used for the purposes and in the manner set forth.

Second, We claim the plates, A and D D, in combination with the bar or rod, B, slot, I, and sliding valve, C, when arranged in the manner and for the purposes set forth.

Third, We claim the journals, n n, box, E E, bearings, K K, boxes, N N, and rod, B, in combination with slots, I I, rivets, H H, and groove, F, when the same are arranged, combined, and operated in the manner and for the purposes set forth.

57,369.—BROOM HEAD AND CLAMP.—M. W. Owens, Waterford, Pa.

First, An improved broom head, formed by combining the wooden head, B, and metallic clasps, C, when constructed as herein described, with each other, and with the bars, E, bolts, F, and corns, G, substantially as described and for the purpose set forth.

Second, The clamp or packer, H, constructed as herein described, when used in combination with the broom head, B C, and corn, G, substantially as described and for the purpose set forth.

57,370.—ERASER HOLDER.—William P. Patton, Harrisburg, Pa.

I claim, First, The construction of the clamping plates, as shown in Figs. 2 and 5, and their combination with an eraser, b, as shown in Fig. 4, substantially for the purpose herein set forth.

Second, I claim the subject of the first claim in combination with a rigid or non-elastic ferrule, g, substantially as and for the purpose specified.

Third, I claim the combination of the plates, Figs. 2 and 5, eraser, b, the screen, c, or its equivalent, and the ferrule, g, with a lead pencil, substantially in the manner set forth and described.

57,371.—VENTILATING BOOT.—Samuel Perry, New York City.

I claim the arrangement of the perforated inner sole, B, and outer sole, C, forming the canal, E, in combination with the grooved plate, H, communicating with the said canal, and the outer air, all constructed and operating in the manner and for the purpose herein specified.

57,372.—TEA AND COFFEE POTS.—Luke A. Plumb, Biddeford, Me.

I claim the flue, B, within the pot, A, in combination with the tube, E, provided with openings covered with mica, F, and the lamp, D, all arranged substantially as and for the purpose specified.

I also claim the radiator, G, in combination with the flue, B, and pot, A, substantially as and for the purpose set forth.

57,373.—STOVE-COVER LIFTER.—Charles H. Porter, Providence, R. I.

I claim a lifter for stove covers, having a covering plate, or its equivalent, for its lifting hook, or end, arranged so as to be operated substantially in the manner described and for the purpose specified.

57,374.—FOLDING AND PLAITING DEVICE FOR SEWING MACHINE.—William Preiss, New York City.

I claim, First, the curved bar, A, in combination with the blade, C and D, constructed and operating substantially as described and for the purposes set forth.

Second, I claim the combination and arrangement of the curved bar, N, folding blades, C and D, and the hinged holder, E, the whole constructed and operating substantially as described and specified.

Third, I claim the combination of the hinged holder, E, with with the blades, c and d, and guides 3 and 4, substantially as described and specified.

57,375.—PISTON PACKING.—E. B. Prindle, Aurora, Ill.

I claim, First, The combination of the sectional beveled packing rings, a a, and wedge rings, b b, placed within annular recesses formed in the circumference of a piston, so that steam, acting through perforations, c c, through the followers of the piston, shall effect the uniform expansion of the packing, substantially as described.

Second, The combination of the two sets of packing rings, a a, the wedge rings, b b, and springs, g g g, with the skeleton rim, A, of the piston, and the perforated followers, B B', substantially as described.

57,376.—TREATING METALLIFEROUS ORES.—William L. Raht, Baltimore, Md.

I claim the within-described process of expelling from metalliferous ores sulphur, arsenic, or antimony, by treating the matte or regulus run from such ores, in the manner set forth.

57,377.—MANUFACTURE OF ELASTIC SPRINGS.—Silas G. Randall, Providence, R. I. Antedated Aug. 8, 1866.

I claim the use of flexible tubing, brought into the form and acting in the manner herein described, and for the purposes set forth.

57,378.—BROOM AND BRUSH HEAD.—George T. Reed, Philadelphia, Pa.

I claim the combination of the handle, F, headlock, H, clamp, I, in two parts, containing one or more ribs, dovetail slides, A A, and connection by two screws, B B.

57,379.—POLE-IRON SOCKET FOR CARRIAGES.—Uel Reynolds, New York City.

I claim the clasp, d, fitted as specified, in combination with the socket, for the pole of carriages, etc., as and for the purposes set forth.

57,380.—GOLD-BEATING APPARATUS.—Thomas C. Robbins, Philadelphia, Pa.

We claim the vertically-guided hammer, d, in combination with reciprocating cross-head, G, or its equivalent, the whole being constructed and operating, substantially as and for the purpose described.

57,381.—HOP-VINE SUPPORT.—Norman C. Roberts, Burlington, N. Y., and Ezra W. Badger, Otsego, N. Y.

We claim the use of two or more wooden rods, A B, to each hill of hops, the rods, B, being placed horizontally, or at an angle, as described, and connected to the rods, A, by means of the wire, c, and staple, d, or connected to the parts, A, by the loops, b, and to the supporting or bracing wire No. 2, by means of the loops or bands, a, which are capable of sliding upon the said supporting wire, so as to allow said rods, B, to adjust themselves in conformity with the depth to which the main rods, A, are driven into the ground.

57,382.—BOTTLE STOPPER.—George W. Rogers, New York City.

I claim the rectangular recessed valve seat, c c, in the bottom of the screw-threaded cavity, in combination with flange plate, g, also used as a valve seat, substantially as described.

57,383.—CHUCK.—Robert and Thomas Ross, Middleburg, Vt.

We claim the long pinions, g, or their equivalents, in combination with the nuts, b, screws, c, and jaws, B, of a chuck, constructed and operating substantially as and for the purpose described.

57,384.—FLY FLAPS.—Tobias Royer, Lancaster, Pa.

I claim the manufacture of fly flaps, or nets, when made by plaiting or braiding the horizontal and longitudinal cords or braids with or into each other, substantially in the manner specified and shown.

57,385.—CAR COUPLING.—Jesse B. Rumsey, Washington, D. C.

I claim the eccentric spring, B, spindle, C, coil spring, F, plate, H, bracket, G, and pin, D, together with a metal case, A, when constructed and arranged in the manner herein set forth.

57,386.—STEAM ENGINE.—William H. Sangster and Justin C. Ware, Titusville, Pa.

We claim the steam chest, the steam cylinder, and the sliding pipe, G, constructed and arranged to operate in the manner and for the porpose herein specified.

57,387.—STAVE JOINTER.—James F. Sayer, Macomb, N. Y.

I claim the double-acting knife, B, in combination with the table having the curved side, a, groove, r, plane, c, and clamp, f, attached, when constructed to operate substantially as described and for the purposes set forth.

57,388.—ROLLING IRON OR STEEL.—Joseph S. Seaman, Pittsburgh, Pa.

I claim, First, Giving the grain of iron or steel a twist by rolling it on its axis, under compression, in the manner and by means substantially as and for the purposes hereinbefore described.

Second, Subjecting metallic bars to rolling compression between parallel bearing surfaces, of greater length than the tangential bearing point given by rolls when the metal is passed between them at right angles to their axes, such bearing surfaces being obtained by causing the metallic bar to pass between grooved cylindrical rolls at an angle to their axis other than a right angle, said rolls being constructed substantially as and for the purposes hereinbefore described.

57,389.—EGG TESTER.—Frank B. Seeley, Johnson's Creek, N. Y.

I claim the combination of the slide, C, with the holes, a a, of the cover, B, and the mirror, c, the whole arranged and operating substantially in the manner and for the purpose specified.

57,390.—BURNING FLUID.—E. D. Seely, Brookline, Mass.

I claim, First, The within described compound, which I term "red kerosene," as a new article of manufacture.

Second, Also the within described process of rendering naphtha non-explosive by treating the same substantially in the manner herein set forth.

57,391.—APPLE PARER AND CORER.—Henry Selick, Lewiston, Pa.

I claim, First, The combination of the slides, C and F, the fork, E, the block, D, and lever, G, with each other, and with the sides of the box, A, the parts being constructed and arranged substantially as described and for the purpose set sorth.

Second, The circular rest, M, in combination with the arm, M, arranged in the manner and for the purpose specified.

Third, The combination of the coring knife or tube, H, and quartering knives, I J K and L, constructed as described, with the box, A, fork, E, and block, D, and slide, C, substantially as and for the purpose set forth.

57,392.—MACHINE FOR CLAMPING AND STRETCHING LEATHER.—Elijah Shaw, Milwaukee, Wis.

I claim the clamping and stretching of fabrics and other articles connected by sewed or stitched seams, for the purpose of burnishing and trimming the seams, by means of a bed, I, and jaws, g g, arranged in such a manner that by the action of a treadle or its equivalent the jaws, g g, will first clamp and hold the article firmly, and the bed then rise in order to stretch the article on the same, substantially as set forth.

I further claim the arrangement of the pivoted arms, K K, with jaws, g, attached, cross bar or slide, M, treadle, H, and springs, L L N, substantially as and for the purpose specified.

I further claim the slide, D, provided with the inclined surfaces, a a, and connected to the treadle, H, by the strap, G, in combination with the inclined surfaces, e e, at the under side of the bed, I, substantially as and for the purpose set forth.

I also claim the combination of the bed, I, provided with the inclined surfaces, e e, slide, D, provided with the inclined surfaces, a a, and connected to the treadle, H, by the strap, G, the pivoted arms, K K, provided with the jaws, g, and the cross bar or slide, M, connected with the treadle, and arranged to operate in connection with the arms, K, all substantially as and for the purpose herein shown and described.

57,393.—CORN SHELLER.—E. F. Sherman, Chicopee Falls, Mass.

I claim the combination of the cylinder, A, bonnet, C, teeth, a, belt, F F, pulley, G G, and trough, M, arranged and operating substantially as described.

57,394.—APPARATUS FOR REDUCING ORES.—George B. Simpson, Washington, D. C.

First, I claim the apparatus consisting of the crucible, tube, or vessel, in combination with the fire-brick, soap-stone, or other material resistant of heat as a covering for top and bottom, and the frame of similar materials to hold the parts together as a whole.

Second, The gas pipes with the gas burner, in combination with the crucible, frame, and gasometer.

Third, The process of resolving metallic ores in an air-tight crucible, tube, or vessel heated externally in combination with common coal gas, petroleum gas, spirit gas, or any other known inflammable gas.

Fourth, The use of salt, borax, saltpeter, soda, potash, or any other known salt or alkali, either dry or in solution as a flux, in combination with the crucible, metallic tube, or vessel, the frame, gas pipes, and the gases for the purposes and uses specified.

Fifth, The process of resolving the metallic ores in the absence of the oxygen of the atmosphere and in the presence of superabundance of carbon by means of heat externally applied, the gases, salts, and alkalies internally applied, in combination with the galvanic or electric current, if necessary, and the apparatus substantially as hereinbefore described.

57,395.—BED BOTTOM.—Edmund Smith, Jr., and Alonzo Chase, Worcester, Mass.

We claim the triangular bracing form of the coil springs, connected at one point to the slats, S S, and the base to the bar or frame, B, substantially as above set forth and described.

57,396.—GRATE.—George L. Smith, Brooklyn, N. Y.

First, I claim a grate which is composed of a number of sections, each one of which is made up of reversible plates, so constructed that when one surface is burnt out another surface can be presented, substantially as described.

Second, A grate which is composed of a series of vertical plates applied to an oscillatory bearer, substantially as described.

Third, The construction of triangular grate plates, a a, with guards, H H, or the equivalent thereof, for protecting the bearer, k, substantially as described.

Fourth, Arranging reversible right-angled grate plates upon movable bearers, k, with spaces between them for allowing of a free circulation of air over the bearers, substantially as described.

Fifth, The construction of the end plates, G, with arms, in combination with the oscillating bearers, and connecting link or rod, d, substantially as described.

57,397.—CAR COUPLING.—D. B. Snyder, Millville, N. Y.

First, I claim the buffer, B, with its socket, x, and lever, E, constructed and adapted for the reception and retention of the bar, D, substantially as described.

Second, The shaft, G, with its cam, c, combined with the lever, E, and with the within described operating devices or their equivalents, substantially as and for the purpose described.

57,398.—TICKET REGISTER.—George R. Solomon, Jr., and Joseph Solomon, New York City.

We claim the ticket box, A B, with a slit, e, and elastic delivering rollers, G G, spring pawl, J, and roll holding shaft, f, all arranged and operating substantially in the manner and for the purpose described.

57,399.—CARPET BAG FRAME.—Albert Sonnekalb and John W. Seib, Newark, N. J.

We claim, in a traveling-bag frame, made with box jaws of equal size and closing into each other, the miter-jointed elbows, b b, in combination with the hinges, when constructed and arranged as described.

57,400.—COMPOSITION FOR ROOFING, ETC.—Chauncey Spear, Hopewell, N. Y.

I claim the composition for roofing, paving, or other purposes, consisting of peat, gypsum, coal ashes, or vegetable mold, combined with clay and tar, substantially in the proportions set forth.

57,401.—BLACKING BOX.—Thomas H. Spencer, Providence, R. I.

I claim the combination of the box with the handle, A, joined at B, and furnished with a short arm, C, for holding the cover, all as described and for the purpose set forth.

57,402.—TOBACCO PIPE.—A. F. Strayman, M. D., Baltimore, Md.

I claim a tobacco pipe bowl or stem composed of cork, substantially as described.

57,403.—FLUTING MACHINE.—Charles A. Sterling, New York City.

I claim a fluting machine composed of a corrugated bed, A, and a correspondingly corrugated segmental presser, B, substantially as set forth.

57,404.—SAFETY CAR TRUCK.—Ezra Stiles, Springfield, Mass.

I claim, in combination with an ordinary car truck, the inside wheels, C C C C, and the central axle, D, and wheels, E E, when arranged and operating substantially in the manner and for the purpose set forth.

57,405.—SHINGLE MACHINE.—Owen Stoddard, Busti, N. Y.

First, I claim the sliding frame, f t, lever, E, arms, I and I', in combination with eccentric, d', and knife, D, arranged as and for the purpose set forth.

Second, The slide, m m, spring, l, arms, t t, and cam, v, in combination with the dogs, i i', ratchet wheels, n' n', and feed rollers, g h, substantially as and for the purpose set forth.

Third, The lever, L', head, K, provided with vertical and diagonal grooves, 1 2 3 4, and shifter, X, in combination with the arms, t t, and cam, v, substantially as and for the purpose described.

Fourth, The set screw, o'', arm, k'', guides, g g, lever, L', and arms, t t, arranged and operating in the manner and for the purpose specified.

57,406.—HOMINY MACHINE.—Henry Taylor, Goose Creek, Va.

First, I claim so arranging the beaters upon a rotating shaft, as to sweep the entire surface, or nearly the entire surface, of the shell or hollow cylinder, substantially in the manner and for the purposes set forth.

Second, I also claim the combination of the heaters, B, and screen, C, for discharging the meal from the machine, substantially as described.

57,407.—COMBINED SCREEN AND WEIGHING DEVICE.—W. H. Taylor, Pittsburgh, Pa.

I claim the inclined screen, D, in combination with the trough, E, suspended from scales platform, c, and provided with the door, F, all arranged with a suitable framing, A, to operate in the manner substantially as and for the purpose herein set forth.

57,408.—FENCE.—Daniel Terry, Wakeman, Ohio.

I claim a fence, constructed with a frame, A B C, sustaining the wire, F, having the posts, A, inserted in the ground, or supported upon foot pieces, D, and attached to one another by pins, E, the said several parts being respectively constructed, and the whole arranged for use, substantially as set forth.

57,409.—PROCESS OF PREPARING RAW HIDE FOR THE MANUFACTURE OF VARIOUS ARTICLES.—William H. Powers, New York City.

I claim the treatment of raw hide with sulphur, or any combi

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nation of, or equivalent to, sulphur, for the purpose of producing the material and the effects before described.

57,410.—TIRE-SHRINKING MACHINE.—Thomas Tully, Litchfield, Ill.

I claim the combination of the curved grooves, G G, eccentric dogs, H H, eccentric lever, D E, and fixed and sliding blocks, F and B, when constructed and arranged to operate as and for the purpose herein specified.

57,411.—GRATE BAR.—Lorenzo B. Tupper, New York City.

I claim the grate bar, formed with a straight, or nearly straight surface, for the fuel, and with a supporting rib having compound corrugations, as and for the purposes set forth.

57,412.—MODE OF SUPPLYING AIR TO AIR CHAMBER.—P. H. Vander Weyde, Philadelphia, Pa.

I claim the combination of air chambers, H and F, the valve, P and N, and stop cock, R and G, all arranged in the manner described, so as to supply the constant loss of air taking place in the air chambers of force pumps.

57,413.—NECK YOKE.—N. H. Vosburgh, Coxsackie, N. Y.

I claim the metal bar or strap, and eye, connected by a joint or hinge, and applied or secured to the leather loop of a neck yoke, substantially as and for the purpose herein set forth.

57,414.—SPICE HOLDER.—A. J. Walker, Lowell, Mass.

I claim the combination of the chambered wheel, A, and holder, G, provided with lid, I, and having drawer, J, and box L, arranged therewith, substantially as described, for the purpose specified.

I also claim the wheel, A, having partition plates, C, slotted center tube, D, and spindle, E, with stud, b, in combination with the stand or holder, G, substantially as and for the purpose specified.

57,415.—BRICK MACHINE.—Robt. L. Walker, Globe Village, Mass.

I claim the reciprocating piston or plunger, H, fitted within a box or tube, G, placed underneath the cylinder or case, A, of the mud or pug mill, and communicating therewith, and having its ends beyond the part in which the piston or plunger works, of taper form, so as to cause the clay to be compressed as it is forced out through and from the box or tube, substantially as shown and described.

I further claim the rollers, f, applied to the ends of the box or tube, G, and arranged to operate substantially as and for the purpose specified.

57,416.—CRUTCH.—R. W. Ware, Chicago, Ill.

I claim the combination of the sliding tube, C, provided with the spur, E, the spiral spring, F, and the adjustable tube, A, when said parts are arranged to operate as herein shown and described.

57,417.—WAGON BRAKE.—James Weathers, Greensburg, Ind.

I claim the arrangement of the bar, F, pivoted or bolted to the hind bound with the rod, G, block, H H, cord, J, shaft, K, provided with wheel, a, and lever, L, constructed and operating as and for the purpose herein specified.

57,418.—STEAM-ENGINE OIL CUP.—Nelson J. White, (assignor to Samuel C. Woodward), Lawrence, Mass.

First, I claim the arrangement of two cups, one within the other, substantially as described.

Second, I claim the arrangement of the cup or casing, A, cup, B, aperture, D E and C, whereby to inject oil or other substance into a steam chest, or other part occupied by steam, through the same apertures by which the steam is taken to the top of the oil or other substance.

57,419.—HARVESTER.—William N. Whiteley, Jr., Springfield, Ohio.

First, I claim the reversible, adjustable driver's seat with an adjustable, reversible standard, located on the main frame between the driving wheels, substantially as described.

Second, I claim the plates, C3, on the pinion shaft provided with two or more handles or arms, and also provided with an eccentric slot or edge in combination with the pawl, for the purpose of releasing and holding the pawl from the ratchet, and releasing the pinion when desired.

Third, I claim the arrangement in combination with a harvesting machine having a hinged cutting apparatus and a removable self-raking attachment of the raker's stand, substantially as described, whereby the attendant is enabled to remove the gavels by hand, when the self-raking attachment is removed, as specified.

Fourth, I claim a harvester frame mounted on two driving wheels, in combination with the divider, K', platform and finger bar hinged to the frame and combined with a reel which acts independent of the rake, which rake is arranged substantially as described, so as to move the grain heads forward at intervals, sideways, and backward over the platform.

Fifth, I claim the combination of a rake, and reel independent of the rake, on a harvesting machine, with a hinged finger bar, substantially as described, the rake moving the grain heads forward, sideways, and backward, independent of the reeling mechanism.

Sixth, I claim, in combination with a reel arranged to traverse on its shaft, the sleeve, R5, and connecting rod, S, which adjusts and holds the reel properly over the cutters throughout all the vibrations of the finger bar.

57,420.—HORSESHOE.—Albert S. Wilkinson, Pawtucket, R. I.

I claim forming a horseshoe of a narrow upper plate, and a broad lower plate attached one to the other by tapering rivets, substantially as shown and described.

57,421.—MACHINE FOR RAKING AND LOADING HAY.—Hosea Willard, Vergennes, Vt.

First, I claim the hay elevator, composed of the endless chains, F F P P, having rods, K Q, attached, provided with teeth, f m, in combination with the guide frame, R, all arranged in connection with, or applied to the frames, A D, mounted on wheels, substantially as and for the purpose set forth.

Second, The toothed shaft, s, in combination with and arranged relatively to the endless elevators, and guide frame, substantially as and for the purpose specified.

Third, The adjustable plates, L L, in which the shaft, H, is fitted, arranged to vibrate upon the axle, C, and applied as shown for adjusting the teeth, f, of the chains, F, higher or lower, as may be required.

57,422.—INSTRUMENT FOR OPENING TIN CANS.—John Willard, Norwich, Conn.

I claim the can opener constructed of one piece of metal with a blade, B, transverse shoulders, b b, and a handle, as herein specified and shown.

57,423.—LOCK.—Geo. M. Wood, Decatur, Ill.

First, The combination of the slide latch, B, with friction rollers, D E E, in order to admit of the free movement of the slide, or to obviate friction, constructed substantially as shown and described.

Second, The combination of the roller, C, roller, D E E, roller, C', and slide latch, B, operating with the arbor, G, with oblique projector, I, substantially as described for the purpose specified.

Third, The locking device composed of the sliding bar, K, working in a mortise, a*, in the spindle or arbor, and operated in the manner shown, or in any equivalent way, substantially as and for the purpose herein set forth.

57,424.—STEAM VALVE.—James B. Wood, Lansingburgh, N. Y.

I claim the outer casing, H, inner and independent nut, G, having projections interlocking, with the notches in the said outer casing and valve stem, F, when combined together, substantially as and for the purpose described.

57,425.—GAS REGULATOR.—Joseph S. Wood, Philadelphia, Pa.

I claim, First, Passing the gas into the floating receiver, C, by the bent pipe, E, and valve, h n, and out by the bent pipe, F, arranged and operating substantially as described.

Second, I claim using the pipes, E and F, as guides for the rising and falling of the receiver, C, substantially as described.

Third, I claim the combination of the vessel, A, pipes, E and F, receiver, C, and valve, h, arranged and operating substantially as described.

57,426.—SUSPENDER.—A. Woodard, Bangor, Me.

I claim the arrangement of spring, a a, stirrup or loop, C, and sheath, B B', when constructed and arranged to operate in manner substantially as and for the purposes specified.

57,427.—PROCESS FOR EXTRACTING OIL FROM FISH.—Edward H. Woodward, New York City.

I claim submitting fish to the action of a digester, as herein set forth, and extracting the oil therefrom without pressure, substantially as herein described.

57,428.—WINDING APPARATUS FOR INCLINED PLANE.—J. E. Wooten, Philadelphia, Pa.

I claim the drums or pulleys, F and F', and pulleys, G and H, the whole being arranged for the reception and guidance of the rope in the course, substantially as described, for the purpose specified.

57,429.—APPARATUS FOR BURNING LIQUID HYDROCARBONS.—A. J. Works, Fair Haven, Conn.

I claim, First, The apparatus, B, when composed of three departments, Q S and T, with its branch pipes, one above and the other below the perforated plate, t t'.

Second, The reservoir, H, pipe, T, cock, I, and pipe, J.

Third, The pyrodynamic apparatus, Z, in connection with the cock, X, for the purpose specified.

57,430.—APPARATUS FOR DESULPHURIZING QUARTZ.—Thomas D. Worrall, Central City, Col. Ter.

I claim, First, Operating a blow-pipe in a confined space or flue, up which flame is passing for the purpose of intensifying the heat through which metal-bearing substances in a pulverized or partly pulverized condition are passing, for the purposes set forth.

Second, I claim operating blow-pipes up flues that form a juncture, so that when the flames meet they may be condensed upon each other, and thus intensified, for the purpose of desulphurizing and oxidizing metalliferous ores passing through said flames, as set forth.

Third, I claim an X-shaped flue, so constructed that the fire starting from the extreme points at the base must meet in the center of the flue, and this whether used with or without blow-pipes, for the purpose set forth.

Fourth, I claim the furnace, A, with open sides communicating with flues, in connection with the blow-pipes, H H H H, and the X-shaped flues, substantially as set forth.

Fifth, I claim the V or diamond-shaped receiver, with perforated base, for the purpose of heating quartz or other metal-bearing substances when passing over its inner surface while the fire is passing over the outer surface, and of delivering the same either into flues below on to heated plates through simple flame, through flame condensed upon itself by means of two or more blow-pipes playing from opposite directions, or upon a hearth upon which flame has been condensed by blow-pipes.

Sixth, I claim the revolving fan distributors in the V or diamond-shaped receiver in flues in a muffle furnace or in an open chimney stack, for the purpose of suspending pulverized quartz and other metal-bearing substances in their downward descent, and of distributing the same in or upon the heated surfaces or through flame, for the purposes set forth.

Seventh, I claim, in combination with the V-shaped receiver, D D, and the spiral furnace, I, a continuous muffle furnace of any shape or dimensions, horizontal, semi-horizontal, or perpendicular, through which ores containing sulphur or other volatile agents may pass, for the purpose of simple desulphurization or for the purpose of driving off sulphur, arsenic, or any other chemical agent which it may be desirable to save for scientific or commercial purposes.

Eighth, I claim one or more inverted V-shaped plates, either firmly built in the flue or suspended by hinges, at the distributing end of a muffle or other furnace or ordinary spout, for the purpose of distributing pulverized quartz falling upon it, in the manner and for the purposes set forth.

Ninth, I claim the V or diamond-shaped receiver, D D, in combination with the inverted V-shaped distributor, E, for the purpose set forth, or any similar purpose.

Tenth, I claim the spiral furnace, with either a double or single flue, for the purpose of securing a slow and gradual descent of pulverized quartz or pyrites while fire is ascending in or under said flues.

Eleventh, I claim so constructing said spiral furnace and the conducting flues connected therewith that while heat and flame are ascending one flue and the quartz, sulphurets or other metal-bearing substances are descending the other, said substances shall not only be freed from their sulphur for the purpose of metallurgical success, but the sulphurous gases and other volatile agents may be collected and converted into any chemical or commercial agent of which they may be made to form parts.

Twelfth, I claim desulphurizing ores, and driving from them arsenic and other chemical agents, for the purpose of securing successful amalgamation and chlorination or smelting, and simultaneously with this converting the sulphurous gases, arsenic, or other agents, into useful articles for chemical or commercial purposes.

Thirteenth, I claim conducting the gases arising from the combustion of carbonaceous substances which have been used to supply heat for the desulphurizing furnace, into a receiver, to be united with the sulphurous gases, for the purpose set forth.

Fourteenth, I claim the furnace, N, connected with the conducting pipes, M and K', for the purpose of supplying any deficiency of carbonaceous gases that may be lacking from furnace, A, for the purpose set forth.

Fifteenth, I claim the use of carbon oil for the purpose of supplying the equivalents of carbon necessary to the manufacture of the chemical compounds, as set forth.

57,431.—COMBINED TONGS AND POKER.—Silas D. Yerkes, Downington, Pa.

I claim, First, A combined fire or cinder tongs, poker and stove, or range cover lifter, substantially as set forth.

Second, A combined cinder or fire tongs and poker, substantially as described.

Third, A combined cinder or fire tongs and stove or range cover lifter, substantially as described.

57,432.—GATE.—Wilber J. Armstrong (assignor to himself and Solomon Dwight), Rockford, Ill.

I claim the combination of a gate, opened and closed on parallel levers, with balance weights to assist it in opening and prevent its receiving injurious jars in closing, substantially as set forth.

57,433.—HORSE SHOE.—John Austin (assignor to Alexander Austin) Rockford, Ill.

I claim, First, The band, B, constructed and attached to the shoe, in the manner substantially as shown and described.

Second, I claim the clip, C, having its upper end provided with a curved hook for taking hold upon the hoof, with its lower end screw threaded, as set forth, in combination with the nut, as shown and described.

Third, I claim the enlarged hole or recess, r, in the upper side of the shoe, in combination with the band, B, or clip, C, to permit the flat portion of the band or clip to be drawn down therein, in tightening up the shoe, as described.

Fourth, I claim the guards, d, for protecting the nuts which secure the rear ends of the band, as shown and described.

57,434.—DOUBLE-ACTION PIANO.—John Joseph Bender (assignor to himself, Henry J. Bangs, and George Miller), New York City.

I claim the above construction and arrangement of an instrument combining two pianofortes, which are played together at one and the same time, and by one set of keys, substantially as described and set forth.

57,435.—BRAIDING MACHINE.—William Darker (assignor to himself and Josiah B. Thompson), Philadelphia, Pa.

First, I claim the vibrating thread carriers, e, for carrying the threads of the lower set of bobbins, made and arranged substantially as described.

Second, I also claim the rock shafts, d, their side arms, f g, and the cam, j, for rocking the said shafts, substantially as and for the purpose above described.

Third, I also claim the application to a braiding machine of the reciprocating bolts, P, and cams, R, for driving the upper set of bobbins, substantially as described.

Fourth, I also claim lubricating the bolts, P, by means of the circular groves, b, one or more in the disk, L, substantially as described.

Fifth, I also claim the lubricating tube, i, suspended from the disk, L, for applying a saturated wick to the arms, g, of the rock shafts, substantially as described.

57,436.—PLOW CLEVIS.—G. P. Darrow, Cincinnati, Ohio, assignor to himself and Joseph Hargrave.

I claim forming the clevis and bolt by casting the same with interrupted threads, in the manner and for the purpose set forth.

57,437.—HAT-IRONING MACHINE.—Mahlon S. Drake (assignor to himself and David Thompson), Newark, N. J.

I claim, First, In a machine for ironing hats an oscillating frame, B, to which is attached the hat block and hat in such manner that the side of the hat shall as it revolves be kept in contact with a stationary iron, substantially in the manner set forth.

Second, In combination with the face plate, X, I claim the spring catches, t t, for securing the hat block to the face plate, substantially as set forth.

Third, The oval holder, g, when used as a cam and in combination with the wheel, b, and oscillating shaft, h, substantially as and for the purpose set forth.

Fourth, In combination with the reciprotating iron, F, I claim the plate, d, for supporting the brim of the hat against the pressure of the iron, when arranged substantially as set forth.

Fifth, In combination with the oval hat block holder, g, I claim the spring f, and set screw, e, for securing the hat, substantially as set forth.

Sixth, So arranging the mechanism for actuating the reciprocating iron, F, and face plate, H, supporting the hat block that the hat block shall be turned as the iron is ascending, and remain stationary while the iron is traversing the brim, substantially in the manner set forth.

Seventh, The iron, F, when attached to an oscillating frame, E, and pitman, J, moved by a crank, K, and actuated by mechanism so arranged that the iron, F, shall traverse one part of its course away from and return in contact with the hat, substantially as set forth.

Eighth, I claim the guide block, S', of the same oval as the hat, attached to a shaft on the oscillating frame, B, and guided by a stationary adjustable arm, n, in such manner as to retain a stationary iron attached to the adjustable arm, m, in constant contact with the hat, substantially as set forth.

Ninth, So arranging the irons that the iron for the side of the hat, shall be attached rigidly to the main frame when in operation, and the irons for the upper side of the brim and crown, the latter, of which, at least, is attached to the oscillating frame, shall be adjustably controlled by cords and weights, substantially in the manner set forth.

57,438.—FRAME FOR TRAVELING BAGS.—Louis Fruhinsfeld (assignor to himself and Wm. O. Headley), Newark, N. J.

I claim the combination of the jaws, A A', curved as shown, with the taper ends, b, in the manner and for the purpose herein specified.

57,439.—LIFTING JACK.—Joshua F. Hammond, Providence, R. I., assignor to Henry Staples, Barrington, R. I.

I claim the combination of the two upright posts, A and B, the one fixed and the other movable vertically, the lever, D, stirrup, E, and the pin, F, the whole arranged, combined and operating as above described.

57,440.—SCYTHE.—Charles M. Hodges (assignor to himself, Willard O. Capron, and Nathaniel Whitmore), Mansfield, Mass.

I claim a scythe in which the blade or cutting portion, A, and the block or holder, B, are made in separate pieces secured together by screws which pass through holes in the two back pieces and open slots in the blade, as set forth.

57,441.—HAIR CRIMPER.—Benjamin Mannon, Newport, Ky., assignor to himself and Isidor Kann.

I claim, in the described combination with a hair pin, A A', the bearing bar, B b, and clasp, C c c' c", for the purpose set forth.

57,442.—APPARATUS FOR CARBURETING AIR.—Donald McDonald, Albany, N. Y., assignor to himself and Noel E. Sisson and Henry Q. Hawley.

I claim the combination of a cylinder or drum constructed like the drum of a wet gas meter, with fine wire gauze or its equivalent attached to said drum and covering the outlet openings of its measuring chambers, substantially as above described and for the purpose above set forth.

57,443.—BILLIARD GAME KEEPER.—George Miller and John Reichert, New York City, assignors to John Reichert and Dominicos Rottkamp.

First, I claim the combination of the ratchet wheels, f m, pawls, i g, thereto attached, arms, k k', and operating levers, h h', on either side of the division plate, arranged and operating substantially as and for the purpose herein described.

Second, The combination of the ratchet wheels, pawls thereto attached, operating levers, and the arms, hammers and bells, or their equivalents, on either side of the division plate, arranged and operating substantially as and for the purpose herein described.

Third, The levers, h h', with their toes arranged and operating substantially as and for the purpose herein described.

Fourth, The combination of the ratchet wheel, f, pawl, g, and lever, h, either with or without the bell attachment, arranged and operating substantially as and for the purpose herein described.

Fifth, The combination of the ratchet wheel, f, pawl, g, arm, S', lever, h h', either with or without the bell attachment, arranged and operating substantially as and for the purpose herein described.

57,444.—LOOM.—Levi Scofield (assignor to himself and Juston B. Waite), Farmington, Wis.

First, I claim a cam shaft, provided with longitudinal slots or mortises to be filled with cams and blanks, or their equivalents, in combination with cams and blanks for the purpose of adjusting the cams in the shaft for weaving different kinds of cloth, substantially as and for the purpose described.

Second, A treadle which has one end pivoted to the frame work of the loom, while the other end has a combined, lateral and vertical movement, when used to throw a shuttle from a right to a left and from a left to a right direction alternately, substantially as described.

Third, Stepping bar, M, or its equivalents, when used to impart motion to a cam shaft, and cams, and to the leaves of a harness, when the whole are constructed and operated substantially as and for the purpose described.

Fourth, Stepping bar, M, or its equivalent, in combination with a sliding bar, S, and treadle, R, when constructed together and operated substantially in the manner and for the purposes described.

Fifth, Stepping bar, M, or its equivalents, in combination with guides, g, or their equivalents, when the whole are constructed, connected together and operated substantially as and for the purposes described.

Sixth, Sliding bar, S, or its equivalent, in combination with treadle, R, elbow lever, K, and lever, l, or their equivalent mechanism, when constructed, connected, and operated substantially as and for the purposes described.

Seventh, A combination and arrangement of the batten stepping bar, rack, and pinion pawl and rachet, cam, shaft and cams, and bases for the leaves of the harness, when the whole are constructed and arranged substantially as and for the purposes described.

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Eighth, A combination and arrangement of the cam shaft, having motion imparted to it substantially as described. A treadle having a vertical and horizontal motion imparted to it, substantially as and by the mechanism described, or its equivalent, when the whole are connected together and operated as and for the purpose described.

57,445.—GRAIN GATE.—G. Seitzinger, assignor to himself and John Armstrong, Ottawa, Ill.

I claim the arrangement of the catch, b, of the rod, C, and gate, B, with the recesses, d e, of the frame, A, and operating in the manner and for the purpose herein described.

57,446.—EYELETING MACHINE.—George Shipman, assignor to Azel Howard, West Bridgewater, Mass.

I claim the application and arrangement of the two levers, E F, together, and to the standard, A, the eyelet punch, the magazine and chute, substantially as and for actuating such magazine and chute, substantially as described.

I also claim the application and arrangement of the spring, a, with the standard, A, and the two levers, E F, applied together and to such standard, and the punch, magazine and chute, substantially as specified.

I also claim the combination as well as the arrangement of the three adjustable stops, h l m, with the levers, E F, when arranged and applied together, and to the frame of the machine, the punch, the magazine and its chute, substantially in the manner as specified.

I also claim the combination and arrangement of the elastic buffer, X, with the standard, A, lever, E, and the magazine and chute applied to such lever.

I also claim the combination and arrangement of the adjustable guard, K, with the eyelet magazine and its ports, the chute and rotary bush, arranged together as specified.

57,447.—HAND VISE OR CLAMP.—Alexander C. Stockmar, New York City, assignor to himself and William S. Lee.

I claim, in combination with the limbs, to which are attached the jaws, the use or employment of the nut, screw, and toggles, when the same shall be constructed and operated substantially as and for the purposes set forth.

57,448.—REVOLVING FIRE-ARM.—John H. Vickers (assignor to the Bacon Arms Company) Norwich, Conn.

I claim the pivoted bracket, C, arranged and operating in combination with the band, H, encircling the barrel loosely, and with the axial pin, E, in the manner and for the purpose herein specified.

57,449.—HYDRANT.—James M. Ward (assignor to himself and John D. Gilbert) New York City.

I claim the sliding valve, F E, elevating nut, D d, diaphragm, I j k, and ports, f h g, arranged and operating substantially in the manner and for the purpose set forth.

57,450.—BRICK FOR CEILINGS.—Maurice Abord, Paris, France.

I claim, First, Constructing ceilings of tubular or hollow bricks supported or suspended on beams or girders, and strung thereon to form a continuity of surface, essentially as herein set forth.

Second, A tubular or hollow brick having recesses, d, whereby to suspend it on the beams or girders, the upper and lower lips of said recesses being so proportioned that the under capping ones will meet those of the adjacent row and conceal the girder, substantially as shown and described.

Third, Grooving or indenting the lower surfaces of the bricks to facilitate the hold of the plaster thereto, substantially in the manner specified.

57,451.—SEWING MACHINE FOR STITCHING BUTTON-HOLES.—James Moore Clements, Birmingham, England.

First, I claim the vibrating hooks, 15 16, arranged and operating substantially as described, and employed for the purpose of drawing the needle silk into a horizontal position in order to supply the barbed hook, as and for the object set forth.

Second, I claim the combination of the eye pointed needle, the circular grooved hook, d3, and the barbed hook, e4, constructed and operating as and for the purpose set forth.

Third, In combination with the above, I claim the detaching hook, g3, arranged and operating substantially as described.

Fourth, I claim the pendulous bar, k3, employed in conjunction with the hooks, 15 16, to feed the needle silk to the barbed hook, as set forth.

Fifth, I claim the arrangement of the circularly feeding device, O2, spring, O4, arm, 4, pin, 3, shouldered lever, O', and hand lever, O, as and for the purpose specified.

Sixth, I claim the plate, r, which carries the needle slide, pivoted to the frame, and adjustable by means of a set screw, r2, in combination with a barbed hook, as and for the purpose described.

Seventh, I claim the combination and arrangement of the several mechanical parts herein described and represented, and mentioned in the preceding claims, or the mere equivalents thereof, forming improved machinery to be employed for sewing, stitching, or embroidery, substantially as herein set forth and specified.

57,452.—MACHINE FOR STRAINING CREAM.—H. Baker, G. F. Holmes and R. D. King, Cortland, N. Y.

We claim, First, The flange for sustaining the strainer on any given size churn.

Second, We claim the cone-shaped strainer and center pivot, in combination with the scroll rubbers, substantially as set forth.

Third, The scroll rubbers in combination with the shaft, crank, cross bar, and fastenings, as herein described and for the purpose set forth.

57,453.—SAFETY BRIDGE FOR RAILROAD CARS.—Lorenzo Hempstead and Lester S. Hills, Hartford, Conn.

We claim, First, The combination of the lattice work floor, c, and railing, f, to constitute an expansion bridge for railroad cars, when the same is constructed substantially as described.

Second, We claim the combination of the swing table, b, with the floor, c, substantially as described.

Third, We claim the combination of the hinge plates, e, with the expanding railway, as and for the purpose described

REISSUES.

2,339.—MACHINE FOR PARING APPLES.—James F. Monroe, Fitchburg, Mass., assignee by mesne assignments of John D. Browne, Cincinnati, Ohio. Patented May 6, 1856.

I claim the combination with the apple-revolving mechanism, the knife-moving and controlling mechanism, and the frame of a clamp, B C, for temporarily attaching the apple-paring machine to a table or support, substantially as and for the purpose herein specified.

2,340.—CAR SPRING.—John G. Pugsley, New York City. Patented Aug. 4, 1863.

I claim, First, the use or employment of a cylindrical spring case, having a central flange that sustains the springs on either side, and toward which they yield, as specified.

Second, I claim a series of perforated spring disks, or annular metallic plates, in combination with a central and flanged distributor, and with concave rings or bearings, against which the spring disks rest, substantially as and for the purposes specified.

2,341.—BALANCES.—Reuben Shaler, Madison, Conn. Patented Nov. 28, 1865.

I claim the combination of the supports, E and F, the parallel bars, G G, arranged substantially in the manner described, with a spring, S, or its equivalent, so as to operate substantially in the manner and for the purpose specified.

DESIGN.

2,427.—PLATES OF A STOVE.—Samuel W. Gibbs, Albany, N. Y.

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The great amount of boiler room, fire surface, and cylinder area, which we give to the rated horse-power, make our Engines the most powerful and cheapest in use; and they are adapted to every purpose where power is required.
All sizes constantly on hand, or furnished on short notice. Descriptive circulars, with price list, sent on application.
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Improved Fusible Plug for Steam Boilers.

Life and property are every day endangered by the possibility of the explosion of steam boilers. Sometimes the causes of explosion being known, they can be guarded against. Such is the case when, for lack of sufficient water in the boiler, its plates become weakened beyond the point of safety. The object of this patent is to provide against such a contingency, and also against undue pressure, and it is highly recommended by competent judges as being certain in its operation.

The shank, A, of the plug is screwed through the boiler plate in the crown plate or over the fire surface. The spaces, B B, are filled with a fusible alloy, which retains the cone, C, in place. Openings, D, are made in the sides of the shell, which are also filled with the fusible metal, and communicating with the interior and through that to the fire box. The cone, C, being held in place by the soft metal and the pressure of steam in the boiler being exerted on its top, too heavy a pressure on the cone will drive it out even if the heat caused by lowness of water does not soften the fusible material.

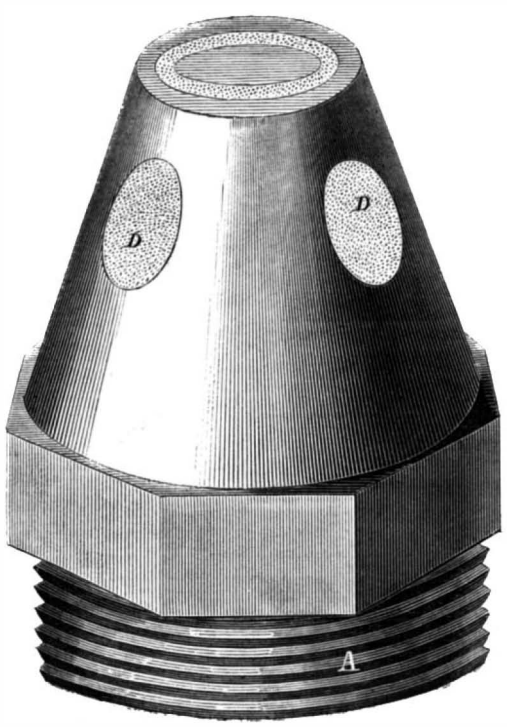
It will be observed that in this instrument the mode of applying the fusible alloy is quite different from any former application. The internal cone is held to its place and resists the pressure within the boiler, only so long as the fusible alloy which unites the two cones remains solid. As soon as the temperature of the cone, determined by the temperature within the boiler, rises to a point sufficient to soften the alloy, the internal cone is driven out, and the steam and water escape. The plug is easily replaced in proper condition again, by simply reuniting the two cones by the proper fusible alloy.

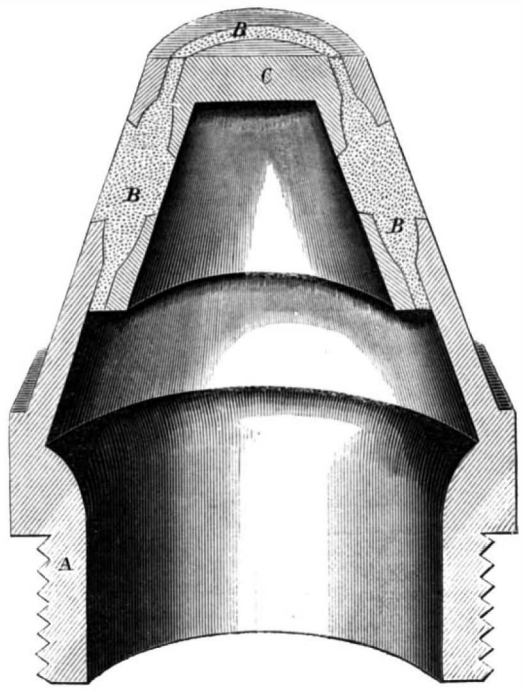
This valve, or plug, has several advantages over the former applications of fusible alloy, in the form of rivets or disks. First, the deposit, either upon the fire or water side, does not in any manner retard or affect the proper operation. Second, by the form of the valve any desired amount of water can be allowed upon the highest fire surface before the valve gives way, and thus, though the operation of the boiler is stopped, not only is explosion prevented, but damage to the plates of the boiler is guarded against.

This plug has obtained extensive use in England, and with the best results. It is used by at least two of the boiler insurance companies, in connection with policies of insurance issued by them, and very much to the pecuniary advantage of the companies, as it is not known that they have yet been called upon to pay any loss from accident to boilers protected by this plug; in fact, recent letters from London state that they have not been called upon to pay any such loss.

The inventor, John Smith, is a resident of England, and patented his invention in this country, March 28, 1865. It has been examined by many prominent engineers and government inspectors, and without exception has received their unqualified approval.

C. W. Copeland, No. 171 Broadway, New York City, is sole agent for these plugs in this country, from whom any further information may be obtained.

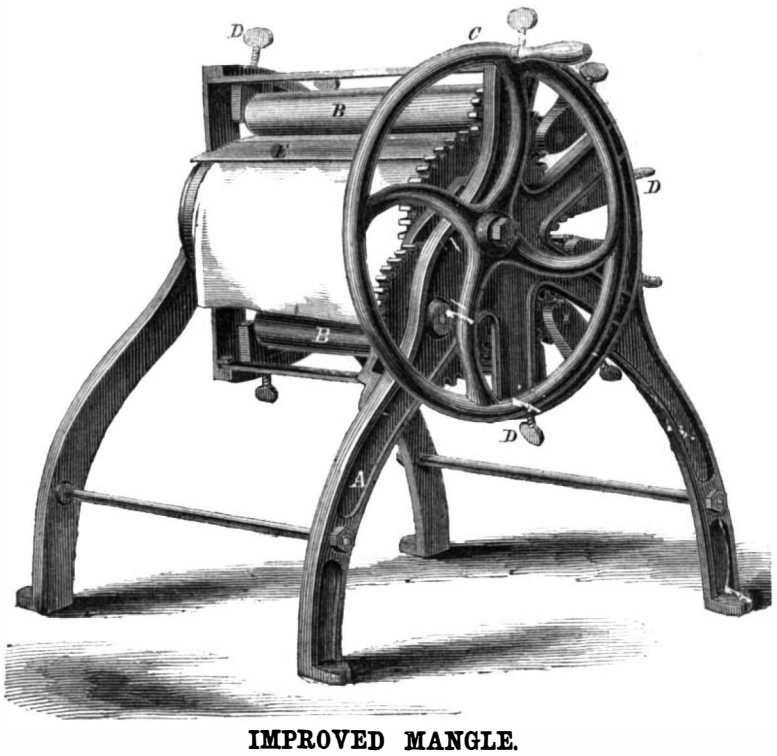




SMITH'S FUSIBLE PLUG FOR STEAM BOILERS.

Improved Mangle.

Next to the traditional nuisance of washing day, is the annoyance of ironing day. A hot fire, heavy irons, burned fingers, and scorched clothes are the common or frequent concomitants of ironing. The mangle in our large hotels and public institutions does the work of the ironers, but the cost and weight of the mangle, as usually constructed, have prevented it from being generally adopted in families. The inventor of the mangle herewith illustrated designs



IMPROVED MANGLE.

this as a substitute for the heavy machines heretofore built, and intends to have it placed within the reach of families.

It consists of a frame, A, carrying a large central roller, on the periphery of which revolve six other small rollers, B, geared into a large wheel, which, by means of the wheel and crank, C, and intermediate pinions and gears is rotated. The pressure of the small rollers is graduated and governed by rubber springs, the tension of which is increased or diminished by means of thumb-screws, D. The clamp, E, over the central roller, is raised or depressed to admit the insertion of the clothing according to its thickness. By this contrivance there is no danger of catching the fingers between the rolls on entering the goods.

The principal advantages claimed for this machine are its portability and cheapness, and the use of a series of rollers disposed around a central drum, so that the garments are not subjected to undue pressure, to the detriment of buttons and other appliances, as is the case in mangles having only two rollers. It is claimed that the clothes leave this machine in a more finished and glossy state than when run through the ordinary mangle.

This improvement was patented through the Scientific American Patent Agency, Dec. 12, 1865, and is manufactured by the American Clothes Mangle Company, No. 278 West Lake street, Chicago, Ill., whom address for further information.

PETRIFIED REMAINS.—A Mobile paper states that in exhuming the bodies interred in the Potter's Field of the new graveyard, a short time ago, one of the coffins broke, and revealed to the astonished gaze of the grave diggers the remains of a Federal soldier perfectly petrified, and looking as natural as life. What was further remarkable, he had not been buried upward of nine months. A new coffin was procured, and this remarkable image of nature's workmanship recommitted to its mother earth in the soldier's burying ground. Several prominent gentlemen of our city visited the spot at the time, and can testify that the body had turned to solid stone, with all the features as natural as life. The ground where he was buried is low, and damp most of the year.

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